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Addresses.

SOME ASPECTS OF FORENSIC PSYCHIATRY.*

By J. W. COURTNEY, M.D., BOSTON.

THE accumulated literature of psychiatric medicine has, in our day, reached such enormous proportions that with it one might easily wall about a fair-sized city. In text-book, monograph and periodical, the every word and deed of individuals whose speech and conduct betray the insane character of their mental operations, has been studied from every conceivable viewpoint with such meticulous profundity that the medical man of merely average powers of application is overawed by the evidence of the almost superhuman industry and apparently boundless leisure which have made such studies possible.

It is no part of the purpose of this paper to attempt to estimate to what extent much of this deep research makes possible the fundamental aim of every true physician—the restoration of his mentally sick patients—or to enter upon a discussion of the proper designation for such groups of insane phenomena as tend, with signal frequency, to coalesce clinically. Each of you has, I am sure, his own well-formed opinion on the first point. The second is of no interest whatsoever outside the purely academic.

Some of us, to be sure, are inclined to view with regret a growing mania on the part of certain present-day psychiatrists to obscure rather than clarify our conception of mental disorder by the attempted establishment of unnecessarily fine clinical distinctions, and by the bestowal upon these distinctions of bastard terms of Anglo-Germanic and Greco-Latin parentage. In spite of this misdirected enterprise, however, the fundamental facts concerning insanity are the same today as they were at the inception of mental medicine, and the lunatic of our own times reacts to his disease in a manner identical with that of the lunatic of centuries ago. Hence, it follows that, for those of us who possess the proper equipment of historical knowledge and sound clinical experience, and who put to the best and fullest use our faculties of observation and logical induction and deduction, there should be but little difficulty in determining, to the satisfaction of the community at large, whether a given act which has brought an individual into conflict with the law, is the act of a sane and responsible person or of one who, according to the standards of sound science and common sense, may properly be adjudged insane and irresponsible. This is particularly true with regard to those individuals who are guilty of acts of violence or of actual homicide—at least this is the thesis I shall endeavor to uphold.

Even the mere tyro in psychiatry knows that in certain types of mental disorder the patient is strongly impelled by his delusions and hallucinations to harm those who are unfortunate enough to excite his insane displeasure. On

* Paper read by invitation before the Rhode Island Medico-Legal Society, at its Quarterly Meeting held at the Rhode Island Medical Library, January 31, 1918.

the other hand, singularly few physicians appear to realize that in the great sum-total of insane throughout this country the percentage of violent or homicidal patients is not merely relatively but absolutely small. It is, nevertheless, the fact, and one whose significance should never be ignored in arriving at our opinion with regard to the mental status and responsibility of a given homicide.

It may, I believe, be safely stated that all the homicidal insane belong in some one of the following clinical groups—1° acute mania; 2° the maniacal phase of maniac-depressive insanity and of the psychoses which bear the questionable label—"involutional"; 3° paranoia, and the paranoid form of dementia precox; 4° feeble-mindedness; 5° the epileptic psychoses; 6° dementia paralytica.

Concerning all these forms of insanity the available clinical data are, through the efforts of certain broadly-experienced and well-balanced men among successive generations of alienists, the best-established and most dependable in psychiatry. From such data we obtain pictures of the various types of homicidal lunatics, which are vivid and comprehensive; and the more closely we are guided by them in judging of the mentality and responsibility of an alleged insane murderer, the more thoroughly we will satisfy the combined demands of justice and science.

To reproduce these clinical pictures does not fall within the scope of this paper, but from them the following paramount conclusions may be drawn—1° that in a given case, murder is never either the first or the only evidence of insanity; 2° that the genuinely insane homicide's act is always either entirely motiveless or is executed for motives which clearly attest, to the satisfaction of even a layman, the unbalanced character of the murderer; 3° that in the maniacal frenzies—and these furnish by far the largest quota of homicides—there is never any deliberate selection of the victim or victims; 4° that the next largest quota of insane homicides is found among the paranoiacs and the paranoid precocious demented, and that their victims are practically always deliberately chosen from the ranks of those who are prominent or quasi-prominent in public life, the choice being made on the ground that such people are the principals in a relentless system of persecution; 5° that the murderous instincts of the feeble-minded most commonly lead to infanticide, and that their motives are either indeterminate or have for background some sexual perversion; 6° that the epileptic murderer invariably springs from the habitual criminal class; 7° and lastly, that the paralytic dement is the rarest among insane homicides and exhibits homicidal tendencies only when, actively possessed by the delusion that his physical strength is colossal, he desires to give noisy and destructive demonstration of it, and is prevented from so doing by his attendants.

In view of what precedes, I will at this point venture the statement that here in America but few homicidal lunatics, not excepting even the astute and wily paranoiac and paranoid types, are allowed to enjoy for long a personal liberty which enables them to carry out their murderous designs upon society. And with equal positiveness, I will add, that in no case in which murder is the act of a genuinely insane person, is the perpetrator of the crime compelled to stand trial for his or her life before the bar of justice.

How comes it, then, if what has just been said is true, that at disturbingly frequent intervals the columns of our press are filled with reports of the testimony of learned alienists in murder trials? This is a question whose answer involves matters almost as broad in their scope as those which lead to the overthrow of a monarchical form of government. Nevertheless, I shall endeavor to answer it, and I trust that you will bear with me if, in this attempt, I appear to be guilty of the unpardonable crime of discursiveness.

In the main the answer concerns the psychology of certain types of alienists—a matter of far greater interest and concern to the profession and public than the psychology of a given alleged insane homicide. From personal observation and from a close study of the transcript of the medical testimony in a number of murder trials in which the defense has been insanity, I have been able to identify and group the following distinctive types among psychiatric witnesses—1° the naïf; 2° the propagandist of the ultra-scientific and 3° the echolalic.

Not the least noteworthy fact about these three types is that they are invariably found on the side of the defense in a given murder trial. No less noteworthy, furthermore, is the additional fact that such a trial is invariably sensational—it is perfectly logical that it should be. Public excitement is naturally aroused when, by their utter failure to agree, men supposedly honest and supposedly equally well versed in mental science make it possible for twelve laymen to become the arbiters of the sanity and responsibility of an individual who has taken another's life.

In this connection, permit me to call your attention to the signal infrequency with which this curious duty devolves upon jurors when proletariat murders proletariat. This, as you perfectly well know, is not because the problem of sanity and responsibility does not arise in such cases, but for the simple reason that the task of its solution devolves, as it should, upon medical men of conscience, sound judgment and ripe experience, unhampered in the performance of this solemn duty by the distracting interventions of legal counsel and the co-deliberation of sophomoric and unwelcome confrères. And be it here said in tribute to the honor and sagacity of those physicians who undertake this most responsible of civic duties, that it is neg-

lightly seldom that their final judgment in a given case fails to lead to the most edifying administration of justice.

To return to the cases which afford the psychiatric expert an opportunity to air his views in court, we invariably find that the principals in the tragedy are socially prominent—whatever that may mean. The one certain thing it does mean, is that there is never a dearth of available funds with which to procure a galaxy of counsel—medical as well as legal—whose sole obvious purpose is to free a murderer from the heavy hand of the law.

When we examine critically the life histories of socially prominent homicides of either sex, we find that they are all cast in pretty much the same mould. The majority of both sexes first see the light of day in surroundings which denote an affluence unknown even to their most recent forbears—surroundings, furthermore, in which genuine cultivation and spirituality are conspicuous by their complete absence. In but few cases is there evidence of ancestral mental obliquity, either immediate or remote, that is worthy of a moment's consideration in its bearing on the sanity of the future homicide. More often than not the paternal parent is a shrewd, hard-headed man of affairs, whose sole preoccupation is to keep at least to the letter of the law in the prosecution of enterprises which tend daily to swell still further an already swollen fortune. In such a case the care of children is left entirely to the mother who, in turn, delegates this task, which would seriously hamper her social activities, to nurses and governesses.

Where family wealth is very recent and the product of paternal native shrewdness, tireless energy and self-denial, it is common for the author of this wealth to determine to give his sons and daughters the "advantages," as the expression goes, of which his life has been barren. Unfortunately, this determination is very apt to breed in the recipients of parental bounty not the traits of character that are an ornament to any period of life, but swinish self-indulgence, spineless dependence upon luxury of every sort, insufferable snobbishness, fondness for vulgar ostentation, aspiration to the meretricious glory of so-called social supremacy—in a word, everything which tends to catapult the devotee of the flesh-pots along the parabolic route which leads from shirt-sleeves to shirt-sleeves.

In certain cases the homicide to be is the only surviving child of a widow of abundant means. For the boy this too often means long years of close attachment to maternal apron-strings, of mollycoddling and character stunting. For the girl it means, with equal frequency, the same careful shielding from contact with the great horde of vulgarians who stand without her own particular social pale, and the exposure, through maternal complacency, to influences within, which are, potentially at least, of far graver menace. The matter of health aside, the mother's

concern centers chiefly upon the daughter's social success, the crowning point of which is a marriage which will, in every way, satisfy the social standards of her little world. To this end the purse-strings are generously loosened and daughter is afforded a sort of continuous private view of life in which the pictures are largely rose-colored,—the frames of gold.

In America the finished product of this system of upbringing is, with notable exceptions, a young woman whose knowledge of the English language is, in most respects, inferior to that of the average Continental of her own sex and social position; whose practical acquaintance with foreign tongues would not avert for her starvation, if getting something to eat depended solely on her ability to converse in them; whose familiarity with old-world monuments is mainly acquired through the latter's proximity to the shops of well-known purveyors of feminine adornment; and whose lack of taste and discrimination in art, music and literature helps to foster the inane productions of knavish artists, of composers of modern musical jingles, and of a school of literature subversive of public and private morals.

A list of this same young woman's positive achievements is equally edifying. The art of self-adornment holds no secrets for her. She is rarely overdressed—quite the contrary. Indeed, on notable social occasions, what with the daring décolletage and the brevity and diaphany of her gown, there is little of her physical charm that is concealed from the eye of even the casual observer. Usually she is versed in all the amazing intricacies of the modern dance, in which she is ready to indulge on every possible occasion. Her genius for absorbing and retaining scandalous gossip would, in the old days, have landed her in the pillory. And her stock of conversational small-change is as unlimited as her feeling of boredom when any topic is introduced that smacks of the intellectual or "high-brow," as she is pleased to term it.

We do not need the assistance of a psychology pundit to enable us to discern in the product of these systems of upbringing the germ of tragedy, whose full fruition is, with too startling frequency, heralded in the public prints under the glaring headline "Society Woman Shoots and Kills Husband," or "Society Man Murders Wife." No more do we depend upon psychology or any other science to make clear to us how fate prepares the soil for this ghastly fruition. Her methods are both stereotyped and obvious.

I shall not attempt to set forth all these methods. A study of but two will serve my purpose. Let us begin with the evolution of the homicide who, in childhood, youth and, in certain cases, even in early manhood, has been sedulously isolated from his fellows by the mother solicitude. In such an individual the growth of character is early strangled by the

rank weeds of egotism, maternally fostered. The invigorating sap of altruism never permeates it. This egotism early manifests itself in the most sinister manner. Lack of attrition with the outside world, the incessant pampering of the body and the constant proximity of nurses and governesses all make for a precocious awakening of the animal instincts. By the time puberty is established the sexual appetite is already abnormal, and finds satisfaction in masturbation and in perversely acts or actual sexual intercourse with housemaids. Not so many years later there begins a surreptitious and tentative tiptoeing. At first the family sideboard provides the means for this dangerous experiment which, toward the end of the individual's teens, is amplified at the bars of hotels where his summers are spent.

Of his intellectual activities but scant mention need be made. He must not be exposed to the health-menacing atmosphere of schools; hence, is tutored at home. He is not dull. He knows to a nicety the amount of his expected inheritance, the character of the maternal holdings and the extent of the annual revenue therefrom. Of banking and single-entry he is conversant with the rudiments. Satisfied with the possession of this knowledge, he concerns himself but desultorily with the more humanizing forms. Standard literature holds only the feeblest interest for him. Occasionally he beguiles the tedium of a railway journey or a stormy afternoon with the novel of the hour.

Small wonder, then, when death casts off forever the maternal apron-strings and the individual in question, now past his majority, is launched upon the world with an ample bank-account, that his sole aim in life should be the satisfaction of his organic longings. We will omit the unedifying details of his sordid and perverse course along the primrose path, up to the time of his marriage. Why he should legitimize his sexual relations with any female is not altogether intelligible. The most reasonable conjecture is that it is a matter of barter, that in the sexual repertory of the chosen woman there are refinements of erotic excitation and satisfaction beyond the compass of all others, and that these are procurable only by grant of legal access to the rake's pocket-book. Be this as it may, the marriage is consummated. Numerous pregnancies occur and are brought to abrupt termination through the illegal offices of venal practitioners. After a time the keen edge of the husband's sexual appetite grows dull, while his craving for alcohol waxes. During the years of his infatuation he has, parcel by parcel, ceded to his wife a goodly portion of his property. He openly curses himself for this folly, as he now terms it, and swears that he is at the end of it. At this change in his attitude the wife's true nature comes to the surface. She becomes the perfect shrew, jealous beyond expression and vituperative as a fish-wife. Quarrels and threats of violence come to be of

daily occurrence. The household servants are thoroughly cognizant of all this, but their silence is assured through various channels. Relatives and friends know nothing of the real situation, and public scandal is successfully averted until the inevitable happens and the bulletin boards and newspaper headlines flare forth the stereotyped "Society Man Murders Wife."

Directly the murder is committed, the husband summons the servants and tells them what he has done. Later he telephones a physician. This done, he sits about, head in hands, moaning and asking himself aloud why he did the deed. This indicates profound unconsciousness of his act. His memory defect is equally profound. He recalls nothing of the circumstances of the crime beyond the fact that there was a violent quarrel similar in all respects to scores of its predecessors, that oaths, villifying names and threats were exchanged, that his she-devil of a wife jumped and secured a revolver, that he snatched it, turned it quickly upon her and rapidly emptied the contents of four or five of its chambers, with the utmost accuracy of which he was capable, into her left chest, and, finally, that she crumpled and dropped in her tracks like a towel from a rack. This memory is, however, of only brief duration and is succeeded by a permanent *amnesia* that embraces every incriminating circumstance.

To the medical man without psychiatric experience there is absolutely nothing in the history of this case that even remotely suggests insanity and irresponsibility on the part of the murderer. From every point of view it seems to him as sordid and commonplace as any in the annals of crime. To the naïf type of alienist, however, it is quite capable of an entirely different interpretation. He cannot overlook the murderer's state of unconsciousness during which he informed the servants of what he had done, and summoned the doctor by telephone. Then, there is the profound *amnesia* by which the crime and the circumstances leading to it are completely obliterated from the slate of memory. These two important psychic phenomena weigh heavily in the diagnostic scale toward the side of epilepsy. The alienist institutes a patient search for other and equally weighty evidence and is finally rewarded. The daughter of the murderer's old nurse remembers distinctly of her mother's telling her that the boy was frequently carried from the yard into the house, feeling faint and complaining feebly but bitterly of pain in his stomach. His barber recalls that on several occasions when he went to the house to cut his hair, the boy appeared at times to pay no attention to what he, the barber, was saying.

Clearly the case is one of psychic epilepsy. Several of the naïf alienist's colleagues confirm the diagnosis and make the further discovery that the murderer is osteologically younger than his years, has asymmetry of the face, and a hypertrophied Darwinian tubercle of the left ear—

hence, is feeble-minded as well as epileptic. Surely, no person thus afflicted could possibly be responsible for murdering his wife. It would be at the same time a scientific error and a serious hardship for the homicide to be compelled to stand trial for his crime. Even the government's experts come finally to see the matter in this light. End result—the poor feeble-minded epileptic is in due course removed from the chilling shadow of the gallows to the solarium of a comfortable hospital for the insane.

Without present comment on what just precedes, let us see how fate fosters fruition of the germ of tragedy in the feminine product of the type of upbringing which I have been at length to describe. Here the picture is not so consistently drab. There is the usual brilliant début into society. The débutante is fêted, admired, flattered and courted. From this point on, marriage is her constant and absorbing preoccupation. Of the true meaning of this sacrament she is as guiltless as an unborn babe. Marriage to her merely connotes an establishment, a place in which to entertain in the lavish manner to which she is accustomed. Of suitors she has an embarrassment of choice. Heaven only knows what guides her selection, unless it be a feline sense of satisfaction at diverting the so-called heart interests of a certain man from some other woman—generally one of her dearest friends. Her marriage is as socially brilliant as her début. The groom is youthful as to years, but old in experience of the world, particularly of the feminine portion of it. He has taken his pleasures where he found them, and marriage promises to put only a temporary curb upon the firmly established habits of bachelorhood. Of the true inwardness of his nature she knows as little as he does of hers—and that is a negligible quantity.

Two or three gay years speed by. Then pregnancy occurs. The prospective mother loathes the physical discomfort of it all and chafes under the enforced interruption of her social activities. Also she takes irritated note of the fact that her plight, instead of increasing, diminishes her husband's devotion to her. On the other hand, towards the end of her pregnancy, his devotion to his clubs is conspicuous and adds tremendously to her irritation. The advent of the unwelcome baby in no way relieves the situation. In the next few years the husband's indifference grows to a marked extent, and he takes little pains to conceal it. He is back again under the thrall of his old and deeply-rooted bachelor habits.

It is needless to pass in detail over the stereotyped emotional phases which mark the reaction of the wife to the husband's treatment. As we all know, they are cumulative and, for him, sinister. For cogent reasons best known to herself, she refrains from seeking relief in the courts. Indeed, the removal of his presence through legal channels would not assuage the

deadly hatred of him that she now nourishes. Night and day she broods over the wrong he has done her. The one thing above all that goads her to desperation is the thought that she has been cast aside for another woman. And then one fine day, after months of incessant brooding, she lashes herself into the more than hellish fury of the woman scorned and with the fixed idea that, if she cannot have this man who is her legal husband, no other woman will, she shoots to kill.

Once the killing is an established fact, the woman that is in her again assumes the ascendancy. She experiences a revulsion of feeling which betrays itself in an hysterical crisis of utmost intensity. In this hour of torment freakish Nature denies her the safety-valve of tears, hence the bodily ravages occasioned by the tumultuousness of her pent-up emotions are widespread and terrible. Quickly she becomes hollow-eyed and pallid. Her flesh drops from her like a mantle. Appetite dwindles to the vanishing point; digestion is at a standstill. The acute hypotonicity of her vascular system betrays itself in palpitating heart and cold, clammy and mottled extremities. Not many days elapse before her trembling limbs refuse longer to bear her and she is forced to keep her bed, where she lies, a huddling, haunted figure—the perfect embodiment of the most abject misery.

Personally, I can discern nowhere in the operation of this woman's mind any faintest evidence that would lead me even to suspect that insanity and irresponsibility were the agents that prompted her to do murder. And yet, through the sworn testimony of alienistic propagandists of the ultra-scientific—or at least ostensibly through their testimony—she is acquitted on the ground that she was entirely irresponsible at the time of the homicide.

Probably you are quite as unable as I to discover upon what basis a diagnosis of irresponsibility is possible in this case. The secret of our inability lies in our ignorance of the ductless glands and their peculiar and subtle influence on the operations of the mind. To the ultra-scientific alienist the situation is as clear as crystal. He knows, from the clinical phenomena presented by the murderess *after* the crime, that she was, at the time of the murder, unquestionably the victim of hypothyroidism. He knows, furthermore, that this pathologic condition exerts a profound toxic influence upon the *unconscious* mind which, according to the authoritative word of the most eminent of present-day psychologists, is the directing center of all human action. Obviously, then, if the directing center of an individual's actions is profoundly poisoned by his glandular secretions, he cannot be held responsible in the eyes of the law for *anything* he may do. The logic of it all is irresistible.

Now comes the turn of the echolalic type of alienist. Consideration of him will be deservedly brief. He always figures with the

other two types, but is never a protagonist in the legal tragedy in which justice is immolated on the altar of pedantry. He is in the cast solely because, as astute counsel knows, juries count noses. His rôle is indicated by my designation of him. Having no independent opinion, he is the faithful echo of the opinions of his associates.

Those of you who have had the patience to follow my discourse with attention must have noticed that, here and there, it has betrayed faint outcroppings of sarcasm. Let me caution you that these were the result of temperamental peculiarities and were not primarily designed to excite mirth—far from it. The whole sorry business of psychiatric testimony in sensational murder trials is a subject for our most serious and thoughtful consideration. Curiously enough, there is an extraordinary parallelism between it and another form of testimony which has recently excited the just indignation of all true Americans. I refer to that of men high up in military circles in the trials of certain German spies. And with the belief that this parallelism will interest you, I venture to digress somewhat and quote the following paragraph from page 183 of the February number of the *North American Review*—"A naturalized German has been arrested for willfully tampering with the machinery of torpedoes. He is charged with treason, the penalty for which, in time of war, is death. This man will be tried before a civil court, his ingenious lawyers will befog the minds of not over-intelligent jurors, the trial will be the same solemn farce that has made law a disgrace in this country, and the man who has forsworn his allegiance and betrayed his country to the enemy will, in all probability, escape by the payment of a fine, paid by the German Government, or a short term of imprisonment: if he has the luck of Captain Hans Tauscher, who offered to plead guilty to the charge of directing a conspiracy to blow up the Welland Canal, but was declared innocent because prominent army officers testified to his high character and social graces, a sentimental or corrupt jury will acquit him and he will go scot-free, with full liberty to be the means of sending American soldiers to their death."

Let us return, now, to our own affair and see what we can do to remove the stigma which at present very justly attaches to forensic psychiatry—a stigma with which, in reality, we are self-branded through the part we have so often played in aiding "sentimental or corrupt" juries to perpetrate a travesty on justice in the trial of capital crimes.

Enforced reforms through legislative intervention have, from time to time, been suggested by individuals or groups of individuals within our ranks, but, up to the present at least, their suggestions have evolved nothing practical. My own feeling in the matter is that legislative interference is quite unnecessary. The

means for wiping out the existing stigma and for self-rehabilitation are, and long have been, entirely within our grasp. As I have already maintained, the clinical data concerning the homicidally insane are among the best established and dependable of mental science, and constitute an acid test which should be applied without modification to every alleged insane murderer, whether he be proletariat or patrician. In this test such elements as sophistry and casuistry are conspicuous by their absence, and if its application were to become universal, we would cease to hear alienists, under oath, emit in court theories concerning mental disease, which are accepted as trustworthy scientific facts by jurors, but which would meet with nothing but contempt even in the humblest gathering of medical men.

THE TREATMENT OF ANTHRAX WITH NORMAL (BEEF) SERUM. REVIEW OF THE LITERATURE WITH REPORT OF A CASE.*

STUDIES IN SERUM THERAPY. VII.

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AND

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SCLAVO'S¹ statistics show that in Italy, where anthrax is a notifiable disease, there were recorded in the eleven years, 1880 to 1890, 34,052 cases, with 5812, or 24.1%, deaths.

Legge,² in a tabulation of 248 English cases, shows the following mortality:

Upper lid, 46%;
Head and face, 43.5%;
Neck, 41.5%;
Upper extremity, 12.5%;
Lower extremity, 1.2%;
Trunk, 1.2%.

Page³ records statistics of 508 English cases with 139 deaths—a mortality of 27.3%.

That the mortality may vary in epidemics is indicated by a report in the Vienna correspondence of the *British Medical Journal*⁴ of 13 persons infected by Russian hair, with 10 deaths, or 77%.

THE TREATMENT OF EXTERNAL ANTHRAX.

Various methods have been used in the treatment of external anthrax. In large part, the practice of excision of the pustule, followed by the application of antiseptic agents, such as 5% carbolic acid, about the site of the lesion, has been carried out. Cantharization has been practised alone, using carbolic injections, caustic potash, or other agents, to provoke wide

* Read before the Boston Bacteriological Club, Feb. 9, 1918.

spread destruction of tissue and bacteria about the local lesion. The powdering of ipecac into the wound, following excision, together with its internal administration, has been the standard method at Guy's Hospital,⁵ the mortality following this procedure being very low. Müller⁷ and Ramstedt⁸ have successfully treated a series of cases by rest, fixation, elevation of the part and the local application of gray ointment. Becker⁹ reports a limited use of salvarsan intravenously in the treatment of anthrax, with one death out of three cases treated.

Boston City Hospital Records for the 11 years, January 1, 1907, to January 1, 1918, show 26 cases of external anthrax treated by excision or expectantly (hot compresses), with a mortality of 8, or 31%. None of these cases furnished a positive blood culture. One case, which terminated fatally, received intramuscular injections of 95 cc. (divided doses) of anti-anthrax serum, beginning 48 hours before death. The cases treated expectantly, seven in number, all recovered. A similar result with expectant treatment has been observed at the Massachusetts General Hospital. The cases which developed a septicemia died. Those which did not develop a blood invasion recovered.

The modern conception of external anthrax is of a low-grade infection, which usually remains localized for long periods, and tends to get well under expectant treatment, except in certain situations, such as the eyelid. If invasion of the blood stream occurs, the mortality is 100%, under any other treatment than that by serum.

SERUM TREATMENT OF ANTHRAX.

The pioneer work in the prophylaxis of anthrax was carried out by Toussaint,¹⁰ who heated the blood of animals dead of anthrax to 55° C. for 10 minutes, and then injected it into the animals he wished to protect. Although the blood was often crowded with bacteria, no harmful results followed, and the inoculated animals were later refractory to infection by virulent anthrax bacilli.

Pasteur, Chamberland and Roux¹¹ first practiced the use of attenuated cultures of the anthrax bacillus as a prophylactic against naturally acquired anthrax. This represents the first use of a bacterial vaccine in medical history, and the first attempt to produce immunity by the use of an agent of known character.

The discovery by Richet and Héricourt¹² of the preventive properties of the serum of immunized animals, followed by the work of Behring on diphtheria antitoxin, and of Kitasato on tetanus antitoxin, led to investigation by many workers of the possibility of producing a similar anti-serum for the treatment of anthrax.

Efforts to obtain a soluble toxin from cultures of the anthrax bacillus were without avail, however, if we except the so-called toxin obtained by Marmier,¹³ by growing the bacillus in

glycerinated peptone solution. This product, it is now agreed, is an endotoxin arising from autolysis of the organisms.

Marchoux¹⁴ first produced experimentally an anti-anthrax serum, which was used effectively in curing animals experimentally inoculated. Selavo, working first with rams,¹⁵ and later with the ass,¹⁶ obtained the anti-anthrax serum, which has had the widest use in the treatment of human anthrax in Italy and England. Animals are immunized by the injection of attenuated cultures of the anthrax bacillus, followed by virulent cultures. In the treatment of infection, immune serum is introduced by intravenous or intramuscular injection, in doses of 10 to 50 cc. More recently, Selavo affirms that smaller doses than 60-80 cc. are useless (cited by Anthrax Investigation Board¹⁷).

Selavo¹⁸ reviews the cases treated in Italy with his serum, and reports a mortality of 6.09% in 164 cases, as compared with a mortality of 24.1% in Italy under other methods of treatment.

Legge² reports 12 English cases treated by Selavo serum, with two deaths, one in a case comatose at the time of beginning treatment. He summarizes Selavo's claims for the treatment under these heads:

1. In very large doses it is innocuous.
2. It can be well borne, even when introduced into the veins.
3. No case taken in an early stage, or of moderate severity, is fatal if treated with serum.
4. With the serum, some cases are saved when the condition is most critical and prognosis almost hopeless.
5. When injected into the veins, the serum quickly arrests the extension of the edematous process, so as to reduce notably the danger from suffocation, which exists in many cases where the pustule is situated on the face or neck.
6. The serum, if used early enough, reduces to a minimum the destruction of tissue.
7. In some situations of the pustule, as the eyelid, serum must be used in preference to any other treatment.
8. Persons attacked, when treated with the serum, appear to become convalescent in the course of a few hours.
9. In internal anthrax, it is the only treatment which can hold out any hope.

Page's statistics³ from English cases of anthrax treated with serum, show an apparent higher mortality than in untreated cases. In the earlier group these results were undoubtedly due to the use of too small doses (10, 20, and 30 cc.). The later results correspond more closely to those of Selavo, if we exclude cases in which serum was used *in extremis* and where death occurred within 24 hours after the exhibition of the serum. The early history of diphtheria antitoxin shows a similar apparent high mortality, due to the introduction of serum only as a last resort. Familiarity with the value

of the serum led to its earlier use and a change in the picture in recent years.

Mendez,¹⁸ from the Institute of Experimental Hygiene in Buenos Aires, claims priority in the manufacture of an antitoxic serum against anthrax, and further claims that 3 cc. of the serum which he prepares will cure cases of external anthrax. Details are not furnished of the method of preparation, but he writes, "Selavo in Italy has confirmed my findings and found literal proof." The presumption, therefore, is that Mendez' serum is produced by the method described by Selavo. In 1073 cases treated by his serum the deaths were 44, or 4.19%. In cases which died, the serum was used in moribund individuals, or the death was due to edema of the glottis and the throat, to myocarditis and atheroma, or to alcoholism.

METHOD OF ACTION ON ANTI-ANTHRAX SERUM.*

Selavo, Burow, Jager and Becker have demonstrated that anti-anthrax serum is an efficient means of cure of even anthrax septicemia, in which the outlook by any other method of treatment is hopeless. All agree that, in this condition, the bacteria vanish rapidly from the blood stream under intravenous serum injections.

In spite of these remarkable effects, efforts to account for the action of the serum have led to contradictory and unsatisfactory results.

a. Bactericidal Activity?

Anthrax bacilli can be grown in diluted anti-anthrax serum, just as they can be cultivated in dilute normal serum. There are no differences, in this respect, between immune and normal sera.

Sobernheim and others have shown that various anti-anthrax sera have no more marked bacteriolytic powers than normal sera from the same species (sheep, cattle, horse, sheep and dog).

Anthrax bacilli exposed for hours in the thermostat and ice-chest to anti-sera, lose none of their virulence, and the serum loses none of its protective powers (Ascoli).

There is no evidence of bacteriolytic activity, even in the body, by Pfeiffer's test. Virulent organisms injected into the peritoneal cavities of immunized guinea pigs exhibit no greater granular change, and undergo no more frequent extracellular solution (lysis), than is shown in control animals which have received injections of normal serum with the bacteria, or, indeed, in controls which have received injections of bacteria alone.

Sobernheim tested many anti-anthrax sera from cattle, sheep and horses for complement-fixing activities, and obtained constantly negative results when germ-free extracts of the anthrax bacillus or anthrax edema fluids were used as antigens. Using suspensions of living bacteria, reactions were obtained with both im-

mune and normal sera. While the reactions with immune serum were measurably stronger than those obtained with normal serum, they were inconstant, many of the anti-anthrax sera exhibiting no reaction.

b. Agglutinating Properties?

The anthrax bacillus is non-motile, and has a tendency to group itself in masses. Distinct agglutination, however, may be had in high dilution with some anti-anthrax sera, but is inconstant and not dependable. No parallel can be found between agglutinating power and immunizing strength of sera. The presence or absence of agglutinating properties has no relation to the quality of the serum.

c. Precipitating Agencies?

As is the case with agglutinins, precipitins are found in some sera, but are inconstant and show no agreement with the protective properties of the serum.

d. Bacteriotropic Qualities?

Sobernheim could demonstrate no bacteriotropic properties in immune sera. Selavo has shown that heating his serum to 55°C. for one hour does not affect in any way its power to confer protection on animals. Sobernheim found that heating to 60°C. did not destroy the protective powers of the serum. These temperatures would destroy opsonins present in the sera.

e. Antiblastic Power?

Under this heading Ascoli refers to the potential power of serum to prevent the normal development of the anthrax bacillus in the body, in particular with reference to the formation of capsules. Many authorities believe that there is a relation between capsule formation in the anthrax bacillus and its virulence. Although capsules do not appear in ordinary culture media, they may be formed in media containing fresh albumens, and are constantly formed on the organisms in the blood and tissues of infected animals.

With Preisz, Ascoli claims that the anthrax bacilli are destroyed so quickly in the immunized animal that the protective capsule of the bacillus cannot be formed. This phenomenon could not be shown in comparative tests of normal and immune serum *in vitro*, but a marked difference was observable in the bodies of normal and immune animals. It was, therefore, argued that, while the immune serum did not in itself possess the substances inhibiting capsule formation, it actuated their production in the body of the immunized animal.

Sobernheim has obtained cultures, virulent for susceptible animals, from the inoculation atrium in highly immunized animals, up to one week after massive injections; Metchnikoff up to 14 days, and Marchoux up to 70 days; so that the bacteria are not all killed quickly in immune animals. Moreover, immune animals

* For references under this head consult Sobernheim, Kelle and Wassermann's Pathogenic Micro-organisms, 1913, III, 583.

are protected, even against the injection of capsulated organisms contained in the blood of animals dead of anthrax.

Preisz admits that capsules may be formed on anthrax bacilli (cultures) introduced into passively immune animals, and Sobernheim and Bail have found capsulated organisms in large numbers in highly actively immunized animals for some time after massive injections of anthrax cultures.

f. Stimulation of Phagocytosis?

Marchoux observed that the introduction of immune serum into normal animals was followed by a rise in temperature, which was slight and subsided quickly, and also by a fleeting leucocytosis. He, with others, believes that phagocytic activity is exhibited in greater degree in animals which have received immune serum than in those which have not.

Sobernheim could not confirm these observations with reference to phagocytic activity. He found that an increase of leucocytes follows the injection of blood serum, whether the serum be normal or immune, and could not observe any qualitative differences in this respect in the reaction of experimental animals.

Pettit, in 1901, demonstrated that injections of heated normal horse serum would be followed by a leucocytosis, and more recent work has shown that a rise in temperature, with a fleeting leucocytosis, will follow the introduction into the animal body of any foreign proteid.

We are left, then, with no tangible evidences of the presence of specific immune substances in anti-anthrax serum, although the clinical and experimental evidence of its powers to protect is beyond question. The only objection to its use is that the preparation and marketing of the serum seem to entail a high expense, the cost of the initial dose running as high as thirty dollars or more.¹⁹

THE USE OF NORMAL SERUM IN ANTHRAX.

The replacement of immune serum by normal serum in the treatment of anthrax is due largely to the activities of R. Kraus, formerly of Vienna, who came to Buenos Aires to accept the headship of the Bacteriological Institute of the National Department of Health of the Argentine Republic. Penna, Cuenca and Kraus²⁰ report the treatment of 50 cases of anthrax by normal beef serum, with no deaths. The serum was heated twice to 56° C. for one-half hour, in order to eliminate the toxic effect of beef serum. In a later paper²¹ they report 90 additional cases, with one death.

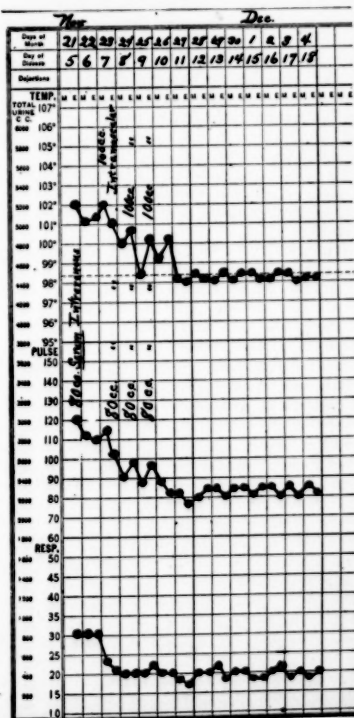
Solari²² reports 6 cases treated with heated normal beef serum, with no deaths.

The mortality in these 146 cases was 0.68%.

Kraus claims that the new medication produces sensibly the same benefits, utilized intravenously or hypodermically, although obtaining without question a greater intensity of action when the serum is introduced directly into the



TREATMENT OF ANTHRAX WITH NORMAL (BEEF) SERUM.



vein. The results "exclude all doubt regarding the real and positive efficacy of this treatment in the cure of malignant pustule, and even of carbuncular septicemia. Hypodermic medication was sufficient in many cases, but in grave cases with intense symptoms, or accompanied by septicemia, the intravenous method is better and more sure, and requires no more care than is necessary in other intravenous medication."

Dosage. "Doses of 10, 20 or 30 cc. constitute the ordinary quantity for each injection, augmented to 40 and 50 cc. or more in more intense cases."

ANAPHYLACTIC RESPONSE.

"It is interesting to note that the therapeutic application of heated normal beef serum has produced no general or local disturbances comparable to those frequently produced by horse serum. This last produces in 10% or more of the cases treated, allergy or serum sickness. Nothing comparable has appeared following the use of normal beef serum. In only two cases have we seen a slight hyperemic zone, with little intensity and fugitive, surrounding the point of injection, and found commonly following the injection of even the most innocent solutions."

METHOD OF ACTION.

"The injections, whatever the via employed, lead to an immediate elevation of temperature with a descent in 24-48° to the normal. At the same time there is produced a favorable local reaction, characterized by diminution of the edema and a bettering of the general condition. In some cases the edema progresses and the fever continues until a new injection is made" (Kraus).

Lignieres,²³ who had supplied the commercial anti-anthrax serum used in the Argentine before the advent of normal serum therapy, entered into a bitter personal controversy with Kraus in the local journals and medical societies. He comments on the greater toxicity of beef serum in comparison with horse serum, even when heated, and denies that it possesses the properties against anthrax such as are manifested by any good specific serum from a horse immunized against anthrax.

In a later paper²⁴ he reports extensive experimental work, all apparently proving that Kraus has been misled in his statements as to the efficacy of normal serum. He argues that anthrax is prevalent in cattle; if their serum possessed any natural defensive properties, it would seem as if their serum would protect them against the disease.

In spite of Lignieres' strictures, Kraus and his co-workers continue to demonstrate the efficiency of heated normal beef serum in the treatment of anthrax.

PROBABLE METHOD OF ACTION.

The most rational explanation of the activity of normal beef serum in anthrax is that it ob-

tains results by provoking a non-specific proteid reaction. Kraus was one of the pioneers in the study of this phenomenon in Europe in the treatment of typhoid and other diseases. Foreign proteids introduced into the body give rise to a transient increase in temperature, accompanied by a leucocytosis, which is also fleeting. This reaction, which is in no way specific, has been shown to be capable of terminating a considerable percentage of cases of typhoid fever by crisis, and is now used widely in the treatment of low-grade infections, such as rheumatoid arthritis.

Foreign serum is, perhaps, the blandest agent which can be introduced into the body for the production of this reaction, and beef serum has the advantage over horse serum that it does not give rise to serum sickness, which did not appear in the series of Kraus, has not been seen by Dr. Edwin Place in a large series of human beings immunized prophylactically against diphtheria by the use of antitoxic beef serum, and has not arisen in the series of wound infections we have treated, although doses totalling 1350 cc. by intramuscular and intravenous injection were given in one case.

CONCLUSION.

In the discussion of the method of action of specific anti-anthrax serum it was made apparent that no satisfactory explanation could be offered of the mechanism which produces the results obtained, other than the excitation of phagocytic activity, and this is not a specific immune response, but will follow the introduction of any foreign proteid into the animal body.

Whatever in the way of immune substances may be present in specific anti-anthrax serum, the amount of these materials must be very small.

It is reasonable to conclude that specific anti-anthrax serum owes its efficacy in small part to specific immune substances, and in large part to a non-specific proteid reaction, obtainable by the use of other proteid substances as well. Of these substances, heated normal beef serum is, perhaps, the blandest and least objectionable.

The history of our case follows:

Nov. 21. The patient, a longshoreman, aged 51, admitted to the hospital. Five days ago there appeared a small sore on the right side of the face, and following this, there has developed very rapidly a marked swelling over the whole right side of the face. There has been severe pain. Patient too sick to give a history.

Examination showed a massive edema and infiltration of the whole right side of the face, extending from the temporal region well down the side of the neck, and posteriorly behind the ear. The right eye is completely closed because of swelling of the lids. The skin over the right side of the face is glistening and dark red in color. The left eye is also practically closed because of swelling of the lids and swelling about the left cheek.

Just lateral to the external canthus of the right

eye is a small circular area about the size of a dime, covered with a hard, dry and almost black crust. No vesicles. There is a dark discoloration about the upper and lower lids of the right eye, which cannot be opened because of the dense infiltration of the lids.

Patient is very restless and in a semi-conscious condition. Can be aroused, but takes no interest in what is going on about him. Temperature 102, pulse 120. Smear from lesion showed *B. anthracis* and a *staphylococcus*.

Patient seen by Dr. Hubbard, who gives little hope for recovery.

Treatment.—Hot poultices over right side of face. (1) 80 cc. of heated beef serum intravenously.

Nov. 23. There was no reaction following the injection of serum. Condition of patient remained practically the same as at entrance. (2) 80 cc. beef serum intravenously, and 100 cc. injected deep into lumbar muscles.

Nov. 24. No general or local reaction. Blood culture negative. (3) 80 cc. beef serum intravenously and 100 cc. into lumbar muscles.

Nov. 25. No general or local reaction. Patient appears much brighter. The swelling of the face is subsiding. (4) 80 cc. beef serum intravenously, and 100 cc. into lumbar muscles.

Nov. 26. About one hour following the last injection of serum, the patient had a chill, but with no marked rise in temperature. The left arm at the site of intravenous injections, is considerably swollen, reddened and tender. There has been a marked decrease in the swelling of the face and patient feels fairly comfortable. Still unable to open right eye.

Nov. 27. Temperature and pulse normal. Patient comfortable. Swelling and redness about left arm subsiding. Very little swelling about the face. Skin over the upper and lower lids of right eye is becoming gangrenous.

Nov. 29. Temperature and pulse normal. No inflammation about the left arm, and practically no swelling about the face. Upper and lower lids definitely gangrenous.

Dec. 3. Most of gangrenous skin and subcutaneous tissues trimmed away. Considerable amount of thick yellowish pus. Smear showed *staphylococcus*. Edges of the living skin are raised, reddened and rolled in, and a considerable amount of pus can be expressed from the undermined edges. Small area of apparently normal skin just above the palpebral border of the upper lid.

Treatment.—Irrigations with beef serum and wet beef serum dressings every four hours.

Dec. 7. Redness and fluctuation over zygomatic process. Small incision made over this area to allow better drainage and through-and-through irrigations with beef serum. There is a large amount of thick pus.

Dec. 11. Practically no pus. Base of ulceration is clean and covered with healthy-appearing granulations. There is a beginning contracture of the tissues below the eye.

Dec. 15. Granulations growing very rapidly and bright red in appearance. There is no exudate. Smear shows only an occasional organism.

Dec. 16. Ready for a plastic operation.

Unfortunately, the blood culture was not made until 24 hours after the first injection of serum. The photograph was taken Nov. 27, after the edema had subsided.

REFERENCES.

- ¹ Sulla Stato presente della Sieroterapia Anti-carbonchiosa, Turin, 1903, p. 27.
- ² Milroy Lectures, Brit. Med. Jour., 1905, 1529.
- ³ Jour. of Hyg., 1909, ix, 279.
- ⁴ Brit. Med. Jour., 1907, i, 1024.
- ⁵ Colley: Guy's Hospital Reports, 1890, xlvii, 1.
- ⁶ Muskett: Lancet, 1888, i, 269.
- ⁷ Deutsch. Med. Woch., 1895, xx, 515 et seq.
- ⁸ Münch. Med. Woch., 1899, xvi, 517.
- ⁹ Dent. Med. Woch., 1912.
- ¹⁰ Bull. de l'Acad. de Méd., 1880, 2me., ix, 792.
- ¹¹ Bull. de l'Acad. de Méd., 1881, 2me., x, 782.
- ¹² Compt. Rend. d. l. Soc. d. Biol., 1888, 1889, 1890, 1891.
- ¹³ Ann. d. l'Inst. Pasteur, 1895, ix, 533.
- ¹⁴ Ann. d. l'Inst. Pasteur, 1895, ix, 785.
- ¹⁵ Centrbl. f. Bakt., Orig. L., 1902, xxxii, 201.
- ¹⁶ Revista d. Igien e di Sanita Publica, 1903, xiv.
- ¹⁷ Brit. Med. Jour., 1912, i, 920.
- ¹⁸ Centrbl. f. Bakt., Orig. L., 1904, xxxvii, 405.
- ¹⁹ Anthrax as an Industrial Disease. Bull. 265, U. S. Bureau Labor Statistics, 1917, p. 18.
- ²⁰ Prensa Medica Argentina, 1917, iii, 262, 297.
- ²¹ Prensa Med. Argent., 1917, iv, 91.
- ²² Semaria Medica, 1917, xxiv, 58.
- ²³ Prensa Medica Argentina, 1917, iv, 49.
- ²⁴ Rev. d. l. Assoc. Med. Argentina, 1917, xxvii, 370.

Original Articles.

THE DIAGNOSIS OF THE CONDITIONS CAUSING PAINFUL AND IRRITABLE BACKS.*

BY JAMES WARREN SEVER, M.D., BOSTON.

THIS subject has been uppermost in my mind for several years, on account of having had to decide in many separate cases the conditions existing in an individual's back, and to give a definite diagnosis and prognosis, at one examination. This has not been a light responsibility, and I am now in the process of looking up these cases to see how far my opinions were correct. I had hoped to have the data ready for you to-night, but my time has been so short, that it is not ready for presentation.

These cases were seen for the Massachusetts Industrial Accident Board as an impartial examiner, and presented all types of backs in all types of individuals—male and female. There was always the psychological element of litigation, which is supposed to be absent under the law in compensation cases, present in these individuals, which added to the difficulty of the correct diagnosis.

These cases differed, however, from the ordinary routine backaches or strains one usually sees, because of the constant factor of definite trauma as an exciting cause.

Painful and irritable backs are most common in the usual run of medical practice, without a history of accident or trauma, and these are the cases I want especially to call your attention to. In fact there are few diseases in which backache does not occur. The condition is attributed to the kidneys by the kidney pill man, and to the feet by the maker of orthopedic shoes, as well as to other ills which flesh is heir to by the person who may happen to have an infallible remedy for that particular ill. It is a much

* Read at the Newton Medical Society, January 14, 1918.

neglected subject and it is not surprising that many cases drift about to become the prey of the patent medicine man, because of lack of adequate examination and definite checking up of the patient's symptoms, history, and posture. I say this advisedly, because so many cases can be so easily relieved by simple treatment.

Now what is meant by a painful or irritable back? It is this—a person complains of pain in the back generally situated low down, that is, at or below the dorso-lumbar junction, and of constant or intermittent duration. Associated with this pain there may be a dragging feeling in the lower back, which may be worse after walking or standing, but may be present only when sitting, and is relieved by walking about.

There may be tenderness—generally vague—extending from the sacro-iliac joints, which are at times the points of greatest tenderness, to the shoulder blades and the back of the neck. At times this pain extends to the legs, down the back of the thighs, accompanied by a feeling of numbness in the legs, which is best expressed by the patients themselves as a sort of "wooden feeling." Following trauma the tenderness is generally localized at the site of the injury and may be accompanied by more or less muscle spasm.

CAUSES OF BACKACHE.

There are three large groups of cases which can be readily differentiated at once as having definite conditions which may cause backache. These are as follows:

1. Arthritis of the spine. This condition is often seen and is a painful and persistent condition. It has its periods of remission and exacerbation, until such a time as the vertebrae become fused, when the painful joints in the spine no longer exist and the cause of the pain is removed, namely, motion between irritable joint surfaces. This condition generally exists with other definite signs of arthritis, and may occur spontaneously, or may be present even without symptoms, until some strain or trauma lights the process up, and results in great and persistent disability. Arthritis of the spine occurs most often at or after middle age, and is apt to appear in the laboring man as well as the desk worker. It is not uncommon, on taking an x-ray of a laborer's back, following an injury, to find a considerable degree of hypertrophic arthritis already present, which has been aggravated, at least symptomatically, by the accident, and consequently prolongs his disability and compensation.

Treatment in these arthritis cases generally resolves itself into the application of a plaster jacket, a backbrace, or canvas corset—anyone of which may have to be worn for an indefinite period to insure adequate fixation to the spinal joints. A diagnosis of arthritis of the spine without an x-ray in a given case is not impossible, and at times easy. The back is stiff to bending in any direction, the onset may be sud-

den or gradual and the disability is great. The cause may be infectious or occupational. The progress towards recovery is slow, even with good treatment.

2. Traumatism, especially frequent in the industrial classes, a very frequent cause of a painful back, is a most common cause of litigation and is a condition about which, an impartial examiner finds it very difficult to arrive at any absolute hard and fast opinion. There is no doubt about the trauma—either direct or indirect—the question is, what damage has that trauma caused? Is there a muscle sprain, a ligamentous tear, a sacro-iliac sprain, a fractured transverse process, or a crushed vertebra? An x-ray may clear up some of the bony injuries, but will not help, except in a negative way, the soft part ones. If the condition is a muscle sprain, the history will be of value. How did the pain start? What was the patient doing when it began? Certain of my cases have had sudden pain in the back when trying to lift a barrel of ashes or when lifting other heavy objects. They felt, as they say, something give way in the back. Generally the pain is in the lumbar region in these cases. There may be localized tenderness over the spinal muscles, and at times the soreness extends around into the flank. I believe the majority of these cases are ones in which a muscle fiber or fibers are torn and, generally, strapping and hot applications, with early use, will effect a cure. Ligamentous tears act in about the same way, are generally of longer duration, and the pain and soreness are deeper seated. Ligamentous tears may be situated in the region of the sacro-iliac joint and so confuse the diagnosis. The ligamentous insertions of the great back muscles in the region of the sacro-iliac joint often lead to doubt and confusion when an injury is localized there. They do not get well as quickly, and heavy work in the future is apt to produce soreness and lameness at the same spot. The treatment in general is the same.

A fractured transverse process is not an uncommon result of having objects fall on the back, or of being thrown against something solid and striking the back. Three recent cases I have seen occurred as follows: One had a pulley-block fall and strike him on the back and break the transverse process of the second lumbar vertebra. Another was a car conductor who was thrown against a car door when the car started suddenly. The third, whose x-ray I will show you, was run over by a team and had all the transverse processes on one side of his lumbar spine broken. Direct and not indirect violence is usually the determining cause. The pain at first is considerable—marked localized tenderness is present, motion is considerably restricted, and as a rule strapping and later barking and massage effect a cure, so that work is resumed in three to four weeks. Complete relief from pain and soreness may not be obtained,

however, for months. There are several other bony conditions which may cause low back pain of which I wish to speak. They are usually associated with trauma and present only, clinically, painful and irritable backs, associated with disability.

The first type is seen usually following falls of some violence, as falls down elevator wells, being thrown out of a carriage or hammock, etc. Clinically there is generally an increase in the normal lumbar lordosis or hollow back, pain and numbness may exist in the legs and the individual is considerably incapacitated, with a very rigid spine. Examination shows a prominent sacrum, and in palpation of it the fingers slip on to a sort of shelf at the junction of the sacrum and the fifth lumbar vertebra. X-rays show that in these cases there has been a definite slipping forward of the fifth lumbar vertebra on its articulation with the sacrum, resulting in some cases in definite cord pressure symptoms. A lateral x-ray will show this defect very well. Treatment should be directed to support of the spine, by braces or jackets. Some cases have been relieved by a bone graft operation to fix the slipping fifth lumbar vertebra to the vertebra above and the sacrum below, and so give relief. The condition is known as traumatic spondylolisthesis. The second so-called bony cause of back pain is one which, to my mind, is yet not proven, according to the English jury verdict. Certain observers have stated that a long transverse process of the 5th lumbar vertebra causes pain in the back by impinging on the crest of the ilium and have shown x-rays apparently showing this condition. Certain cases have been operated on with relief by removing the offending process. It is not yet clear to my mind whether rest in bed for several weeks or removal of the process caused the cure. The operation is difficult and dangerous. If you recall the anatomy of the region you will remember that the transverse process of the 5th lumbar vertebra is situated well in front of the plane of the crest of the ilium, and as increased lordosis, which is said to cause the impingement, increases also the distance between these two bones, I fail to see just how anything but inaccurate observation, or an enthusiastic operator, could attribute pain and disability to such a cause in the absence of anything but definite congenital malformation.

3. The third class of cases, generally recognized as such, but often associated with definite orthopedic defects, is that where displacement of the pelvic organs in women is at fault.

Hutchins¹ believes that an anteposition of the uterus, associated with a descent of the cervix, and so resulting in an engorgement of the ovaries and their veins, is a frequent cause of backache.

Graves,² on the other hand, found that 76% of 500 cases had backache associated with retro-displacement of the uterus, and a corrective

operation for this condition relieved or benefited 86% of 263 cases he could trace.

MacFarlane³ states that 16% of 938 gynecologic cases complained of backache. The pelvic findings in 159 of these cases comprised chiefly lacerations, retroversions, prolapse, and inflammatory conditions, such as adherent appendages and endocervicitis. The incidence of marked nervousness in these 159 patients with backache was about 9.3%, or about equal to the incidence of adherent appendages, and half as frequent as that of prolapse. She thinks that the neurosthenic state predisposes to backache of pelvic origin by lowering the resistance of the central nervous system. The fact that the backache was permanently relieved by appropriate gynecologic treatment led to the belief that these backaches were caused by the pelvic condition. Here you have three authorities all agreeing that pelvic conditions cause backache.

One point of interest and importance which Graves makes is that uterine back pain is invariably confined to the sacral or very low lumbar regions.

On the other hand, operations performed to correct pelvic displacement because of backache often fail because the orthopedic or postural defects of the individual are not corrected. It is fair to presume that in a certain number of cases that, had orthopedic measures been carried out first, the operation would not have been necessary.

We now come to a large group of cases which do not fall under any of these previous classes mentioned, but which are very common. These cases may be subdivided into two classes, namely, (1) static or postural strain and (2) sacro-iliac strain.

This brings us to the definition of what is meant by this classification, and I will take them up, therefore, in order.

1. Static or postural strain, not the result of trauma. In an important and interesting paper several years ago Reynolds and Lovett⁴ determined the center of gravity of the human body in the upright position, and noted various changes from the normal, and their effects on the posture and musculature. They showed that a forward displacement of the center of gravity put increased work and strain on the back muscles, which, if sufficiently long continued, produced backache and strain; and arrived at the conclusion, from their experimental work, that static backache was the result of definite mechanical defects in the posture.

Now you know that normally in the upright position an individual, when at rest, is supposed to carry his weight on his bones and not on his muscles or ligaments. The center of gravity generally falls in a line running from the tip of the mastoid, through the front of the shoulder, great trochanter, just back of the patella and about an inch in front of the external malleolus. Any variation from this normal implies muscle

and ligamentous strain and so pain—therefore, when a person habitually stands with the body in a position of poor posture there is created a lack of normal muscle balance and consequently muscle strain, which is translated into pain. The so-called "carrying posture" is a good example of poor standing position. Here the trunk is carried back over the pelvis, the back is rounded and the abdomen protuberant, the low back hollow or flat. Poor postures are seen many times in poorly nourished young people who stand with a slight lateral curvature and a round back and shoulders, and who complain of backache. Other types are those individuals, women especially, who present on examination a hollow back with a marked increase in the normal inclination of the pelvis. Often there is a moderate degree of tenderness along the back muscles and over the sacro-iliac joints. A large number of these latter type of cases complain also of vague pains in the legs and feet. Into this class can be put also those obese individuals who have to lean back to balance themselves, and so by constantly putting extra work on their back muscles, tire them out and stretch their back ligaments and so strain their ligamentous insertions and may strain the sacro-iliac joints. These are best treated by a corset or belt which holds up the abdomen and takes the strain off the back and puts it on a brace or corset. An examination should be made to determine whether or not there is a short leg in all cases, for many cases of backache are due to an unrecognized short leg and can be cured by making the short leg as long as the other one. One other point of the greatest importance is the presence or absence of a short or tight heel cord. Normally, the foot should go about 10° beyond a right angle in dorsal flexion, but you will find that in many of these indefinite backache cases, dorsal flexion even to a right angle is not possible, and an attempt dorsally to flex the foot causes pain all along the back of the leg even extending to the buttock and back. This condition is probably part and parcel of the whole lack of proper muscle balance and posture, but its correction alone will often cure a troublesome and persistent backache. Associated with these tight heel cords, are often feet which are the reverse of flat, in that they present high arches and painful callosities on the balls of the feet. Stretching the heel cords several times a week, which relieves the so-called "wooden" feeling in the legs, with a specially designed machine, and taking the weight off the balls of the foot by means of a plate or an anterior heel, as devised by Dr. Cook of Hartford, which consists in a lift half an inch wide by an eighth to half an inch thick running across the sole of the shoe, just behind the ball of the foot. This acts as a wedge at that point and causes plantar flexion of the toes, and elevation of the metatarso-phalangeal joint and so relieves pain and pressure at that point; and

raising the heels of the shoes a quarter to a half an inch will often cure these cases. Raising the heels of the shoes will do several things. First, it will generally please the ladies who dread a low heeled, sensible shoe; therefore their pride is appeased and they begin to think that you are really quite sensible. Second, by so doing, you are taking the strain off the tight gastrocnemius muscle, and so relieving pain. Third, you are tipping the body back as a whole and consequently are relieving the tension on the irritated erector spinae group of muscles and letting up on their bowstring tension. The effect of these simple remedies in suitable cases is remarkable, and the relief from pain and discomfort marked often in 24 hours.

Certain patients I have seen always develop exquisitely tender areas about the buttocks and anus, when their posterior musculature becomes too tight, and one even develops, regularly, anal fissures which promptly clear up after stretching. It is needless to add that proper corsets, which support the strained back muscles and the abdomen well, should be supplied to all these cases. Such a corset should be no longer than the trochanter, should grip the pelvis firmly, should fit the back well, should be no higher than the top of the shoulder blades behind, and the lower ribs in front. It is better front laced, should have a flat abdomen, and is best applied lying down.

This type is common, and I believe they are often called cases of sacro-iliac strain, whereas, to my mind, they have no such condition. If they have the maximum amount of their discomfort over one or both sacro-iliac joints, associated with these other conditions, I believe that it has simply happened that the maximum strain has localized there, and that a strain of the sacro-iliac joint has developed secondarily and is not primary. They will get well under the above course of treatment plus rest and, later, exercises and massage.

There are also many cases of backache seen in poorly developed individuals, whose musculature is poor, whose resistance is low, and whose bodily posture is bad. These cases are the result of the same chain of events—namely, poor posture and lack of muscle development and balance, and are to be treated along the more general lines of developmental work. Many neurasthenics come into this class, but as a rule the backache seen in them is one which is distributed generally all over the back and rarely localized in any one spot.

2. **Sacro-Iliac Strain or Sprain.** This last class has been before us for a reasonably long time, and has been a popular one in which to put all cases of low backache. The joints have been there anatomically, the tenderness and pain has been situated at or about the joints, and the diagnosis is one easy to make offhand, without much of an examination, and satisfies both the doctor and the patient.

Now it is not to be denied that the sacro-iliac joints are real joints and are subject to such sprains and diseases as are other joints, but that all low backaches should come from these joints seems too good to be true. I think that the explanation offered above in the description of the postural backaches covers a good many so-called sacro-iliac strains. The strains and slippings of the sacro-iliac joint during and following pregnancy are common in everyone's experience and can generally be relieved by proper strapping and a good corset. One word of caution about strapping: always carry the plaster from in front of the anterior-superior spine on one side, to in front of it on the other, pulling it as hard as you can. Also put a felt pad about half an inch thick over the sacrum, extending up the lumbar spine, and you will get better results. Most strapping, as I see it, is inefficiently applied.

Sprains of the sacro-iliac joints are seen after sudden wrenches, especially when the person is bent forward and to the side. They seem to follow twisting strains rather than direct ones, either in the upright or flexed position. Certain cases are accompanied by local swelling and tenderness and, although increased motion and slipping can rarely be detected and the x-rays invariably in my experience prove negative, there is no doubt as to the condition. Associated with these sacro-iliac strains one usually finds more or less pain and discomfort down the back of the leg on the affected side, extending often to the foot and calf. As the condition in the joint improves, this pain in the leg gets well. This is attributed to the pressure on the nerves of the sacral plexus, which lie on the anterior surface of the joint in the pelvis, as shown by Albee² and others. This nerve involvement is, I believe, not due to a pressure of the slipping joint, which cannot slip enough to cause such pressure, but may be due to local congestion which involves the tissues about the sacral cord. Slipping in the joint is, I believe, rare in the usual run of cases, and is observed only in those cases where ligamentous relaxation is great, such as is seen after pregnancy and in certain other cases of long duration of poor posture and back strain in rather fat people. I have seen only two such cases where the slipping could be felt, both in obese washwomen, who were so incapacitated finally, that in order to get out of bed they had to roll on to the floor and then climb up on themselves much in the same way a case of Pott's disease or progressive muscular atrophy gets up from the prone position. They were both promptly relieved by strapping and, later, corsets. Certain cases of acute sacro-iliac sprain, often seen following exposure and resembling an infectious or rheumatic attack, exhibit the greatest degree of pain and disability. Slipping of the joint cannot be demonstrated, but is felt and described by the patient when it occurs, generally with a twist of the body; the pain is excruciating and often accompanied with nausea or faintness. There is gen-

erally some pain down the leg on the affected side, and local tenderness over the joint. There is no mistaking these cases, for the picture is generally complete. Salicylates, rest and strapping often give relief in a few days, plus manipulation in a certain number of cases.

In about 80 cases of painful backs, seen for the Massachusetts Industrial Accident Board, in the last year or two, as the result of injuries, there was only one or two which seemed to be cases of sacro-iliac sprains as against 24 cases of compression fracture of the vertebrae; which is a most common condition and one frequently overlooked.

Two other points in connection with sacro-iliac slipping—relaxation and strain, which I wish to emphasize. First, when there is a real looseness or sprain of these joints, the patient always states that he feels as if he were "breaking in two." This is a common statement and I believe applies to no other condition. Second, in regard to the so-called leg-raising test, so commonly used, I believe it is fallacious, for this reason. Any injury to the lower back which results in back strain causes muscle irritability, which of itself will limit leg-raising with the lower leg extended. This is especially true in the static type of cases and should no more be regarded as a sign of sacro-iliac strain than of flat-foot. It is too frequently associated with other back conditions to be pathognomonic of any one of them.

A word of caution about back pain—never be content with an examination which does not include an x-ray, especially in cases of trauma. It is not difficult to have one made, and will reduce the percentage of guessing and raise the percentage of correct diagnoses.

REFERENCES.

- ¹ Hutchins, H. T.: The Role of the Anteposed Uterus in the Causation of Backache and Pelvic Symptoms, *J. A. M. A.*, Sept. 22, 1916, Vol. lxvii, No. 13.
- ² Graves, W. P.: *Amer. Jour. Orthop. Surg.*, December, 1917, Vol. xv, No. 12.
- ³ MacFarlane, Catharine: *J. A. M. A.*, March 31, 1917, Vol. lxviii, No. 13, p. 1000.
- ⁴ Reynolds, Edward, and Lovett, R. W.: An Experimental Study of Certain Phases of Chronic Backache, *J. A. M. A.*, March 26, 1910, p. 1033.
- ⁵ Albee, Fred H.: Study of the Anatomy and the Clinical Importance of the Sacro-Iliac Joint, *J. A. M. A.*, Oct. 15, 1909, Vol. liii, p. 1273.

Clinical Department.

A CASE OF CEREBROSPINAL MENINGITIS SUCCESSFULLY TREATED BY INTRASPINAL AND INTRAVENTRICULAR ADMINISTRATION OF ANTIMENINGITIS SERUM.*

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THE following case of cerebrospinal meningitis presents several features of unusual interest both clinically and therapeutically. In

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particular, it emphasizes the need of intensive treatment with anti-meningitis serum, not only intraspinally, but if indicated, as in this case, intraventricularly.

The case is that of a naval lieutenant who was brought to the McLean Hospital May 6, 1917, in a delirious condition, the previous history of which was unknown, even to the immediate family, the patient having arrived at his home in a state of collapse and confusion on the morning of the day of his admission to the hospital, unable to give any account of his experiences up to that time. Later, however, facts came to light which are embodied in the following more detailed history.

The family history shows that the paternal grandmother died of a cancer of the throat. The father died of a cancer of the bladder after the patient's discharge from the hospital. His mother died of cerebrospinal meningitis a week after the patient's admission to the McLean Hospital, having contracted the disease from him after an exposure of a few hours while he was at home, just before his admission to the hospital.

The patient, who is 31 years old, was thought to have had spinal meningitis at the age of 6 months, having had several convulsions for 24 hours. Since that time there has been, however, nothing to suggest the presence of epilepsy or other nervous disorders.

His early life was uneventful. He was appointed to the Naval Academy at Annapolis, from which he graduated in 1907. After graduation he progressed rapidly in the service, and at 21 was given command of a vessel. Some time later he was recommended for promotion, and when taken sick was chief signal officer on the flagship of the squadron.

In January, 1917, he had a severe attack of ptomaine poisoning while attending an official banquet in Haiti. For several days he was in a critical condition. He recovered from the immediate effect of this illness, but did not fully regain his normal strength, though he was able to resume his work. Aside from this illness and its after-effects, he has always been in excellent health.

He was stationed with the fleet when he became sick, and left his ship presumably on May 4 on a 10-days' leave of absence because he felt somewhat nervous and run down. Upon reaching New York he became very ill, but with assistance was able to go from his hotel to take the midnight train for Boston. Before leaving, he wired his family that he would be home the following morning. Reaching Boston, he took a taxicab for his home, and on his arrival was so sick that he had to be helped into the house. After getting into the house he said he was sorry to come home sick, but that he was a nervous wreck and had fainted just after sending the telegram. He appeared to have a chill and went to bed. He seemed dazed and complained of a terrible headache and rubbed his head and moved about very restlessly.

At one o'clock he began to get excited, and thrashed around so much that he broke down the bed and neighbors were called to help care for him, and when the physician arrived at his home he found the patient dazed, pale and much excited. His pupils were equal and the reflexes were normal. He had no fever. He was given some citrate of magnesium and vomited. A quarter of a grain of morphia was given, and at 2 o'clock he was quiet. A little later he became excited again, and a quar-

ter of a grain of morphia and 1/100 of a grain of hyoscin were given, after which he slept.

He was brought to the hospital about 4 o'clock on the afternoon of May 6, well under the influence of hypnotics, and slept for nearly two hours. When seen by the physician, a little after admission, he could not be aroused, was limp and perspired freely. His pulse was 72, of good quality, but quite irregular; respirations were slow and deep. There was questionable rigidity of the neck, but he was so resistive that this could not be accurately determined and was, if present, not constant. The pupils were about 3 mm. in diameter; the left seemed a little larger than the right. They responded to flashlight. The reflexes were everywhere active and equal. At this time a definite Babinski was obtained on the right, but this later disappeared. There was also considerable resistance offered when the leg was raised after the thigh had been flexed. The abdomen seemed quite hard. There was an abrasion of the skin extending along the spine in the lower dorsal and upper lumbar region. He was catheterized and 16 oz. of urine were withdrawn.

During the night he was less somnolent and began making restless efforts to get out of bed. The following morning his temperature was 97 and the pulse 88, and throughout the day he remained delirious, talked about being aboard ship, asking if shell and powder were ready, etc. Momentarily he was clear and made normal responses, and he continued to complain of severe pain in the center of his head and in his back. His temperature remained sub-normal until night, when it rose to 101.8.

On the 8th he appeared very sick. He was rather dull and only semi-conscious. Talking with him seemed to increase his restlessness, which was at all times present. He was not resistive, and complied as well as he could with requests, and always tried to be polite and pleasant. He kept up more or less of a fragmentary talk as he moved about. He apparently tried to answer questions but did not seem able to. Only now and then in his delirium could a relevant response be obtained. Physical examination on this day showed a slight left facial palsy. The left corner of the mouth did not close completely. The tongue pointed to the right. The left cheek seemed fuller than the right. The eyes were prominent, and the tension of the right was possibly a little greater than that of the left. Both pupils reacted promptly to flashlight and accommodation. The left was distinctly larger than the right. The reflexes were everywhere present and active. As far as they could be elicited, there appeared to be no sensory disturbances. There was no ankle clonus, no Babinski and no Kernig's sign. The skin over both the elbows, the knees and buttocks was covered by a punctate eruption. Wassermann examination of the blood was negative. Throughout the day he continued much confused and rambling in his conversation.

On the 9th his condition grew rapidly worse. He was usually delirious, often somnolent, but occasionally cleared enough to give some rational responses. He tried to cooperate when the nurse attended him, but would immediately become stuporous. He appeared to be suffering continuously from severe headache.

In the evening he seemed very weak, and symptoms of meningitis were quite evident. Though he had been passing considerable urine during the day, he was catheterized and 32 oz. of urine were

withdrawn. A little later his neck seemed rather rigid, and temperature, pulse and respiration remained high. His pulse became weak, the stupor became deeper, respiration became irregular and shallow, at times distinctly of the Cheyne-Stokes type, and he seemed to be failing rapidly. Dr. W. Jason, Mixer was called in consultation, and at 11 p.m. a lumbar puncture was made under primary ether and 10 cc. of a cloudy fluid were withdrawn. Examination of the fluid by Dr. Frederick T. Lord showed the presence of meningococci. At 2 a.m., May 10, Dr. Lord, under primary ether, withdrew 22 cc. of a cloudy fluid and injected 16 cc. of anti-meningitis serum. Almost immediately after the first withdrawal of fluid the patient seemed to rally somewhat. After the injection of the serum his general condition as to heart action and respiration improved, though he remained semi-conscious until about 5 a.m., when he awoke and talked quite naturally with his mother. About an hour later he talked clearly with the nurse and dictated a perfectly coherent, well-expressed and moderately long letter to a superior naval officer. He called the nurse by name and told as much as he could remember of events immediately preceding his sickness.

The next morning he was again stuporous, though his temperature had dropped and his pulse and respiration remained high as before. He could be roused a little, but could only indistinctly mutter a very few words, sinking quickly into unconsciousness again. At this time the asymmetry of the face was not so apparent; the pupils were small and equal and the reflexes showed nothing abnormal. At 9 p.m., under primary ether, 32 cc. of a cloudy fluid were withdrawn by lumbar puncture and 25 cc. of anti-meningitis serum were injected. The cultures of the fluid gave a heavy growth of the diplococcus intracellularis.

On the following day his condition showed improvement, but he was somnolent much of the time. When awake he complained of pain in the back and slight headache. His temperature dropped to normal and the pulse and respiration showed a corresponding improvement. At 7 p.m., 30 cc. of fluid were removed by lumbar puncture, and 25 cc. of serum injected by Dr. Lord. This was attempted under novocaine, but upon injecting the serum the patient complained of very severe pain in the hips and legs, and primary ether anesthesia had to be resorted to. The withdrawn fluid proved to be sterile. Following this operation, the patient's condition again showed rapid improvement. During the night he again developed a slight febrile reaction, though his fever dropped to normal at noon on the 12th.

In the evening his temperature was again somewhat elevated, and under local anesthesia 35 cc. of a cloudy, somewhat bloody, fluid were obtained by spinal puncture, and 30 cc. of serum were again injected under primary anesthesia. For several hours the temperature rose, reaching 104 at midnight. He was very restless and delirious during the night, but during the following day slept for an hour or so from time to time. An examination by Dr. Lord of the fundus of both eyes was practically negative except for slight blurring of the discs. Examination of the ears, likewise, showed nothing abnormal.

The following day his temperature was again elevated and there was very little change in his general condition. On the 15th the situation was

about the same. His temperature continued high and irregular, severe headaches continued on and off and the delirium persisted. While he was not losing ground, he was not making much progress.

On the 15th, a lumbar puncture was again made and 14 cc. of a clear fluid were withdrawn and 7 cc. of serum were injected. While clinically this was followed by a temporary improvement, the delirium and irregular temperature persisted for the next few days. The withdrawn fluid was sterile, and it was evident that no further progress could be made by spinal injections.

On the morning of the 18th his temperature again reached 103. His pulse was rapid and the respiration was about 30. With the persistence of the fever and symptoms indicating intracranial pressure, it was very evident that the infection was continuing in the cerebral ventricles, and that the disease process had probably become walled-off. The patient's remarkably favorable reaction after each serological treatment intraspinally gave rise to the hope that if serum could be introduced directly into the ventricles a favorable reaction might be possible. Although precedent determined that in cases of this kind trephining should be a measure of last resort, it was felt that in this case any loss of time meant a fatal termination, or at best a chronic meningitis, and it was decided to operate without delay. On the morning of the 18th, under ether, a trephine opening was made 3 centimeters behind and above the left external auditory meatus; the left ventricle was tapped and 15 cc. of an opalescent fluid, under considerable pressure, were withdrawn. This was replaced by 10 cc. of anti-meningitis serum. The ventricular fluid was strongly infected with the meningococcus. At the same time 10 cc. of fluid were withdrawn by lumbar puncture. This was slightly yellow in color, but clear and sterile. The needle which was introduced into the ventricle was about the size of an ordinary needle used for lumbar puncture, though it was closed and rounded at the end, with two small lateral openings, thus avoiding any cutting of the cerebral tissue. The patient bore this operation very well. In the afternoon his temperature had dropped to 100, his pulse to 90, and it was of good quality. While he was somewhat confused he was free from headache. The following night he was rather restless. In the afternoon his temperature again suddenly rose to 101.5, and the ventricle was again tapped through the same opening; 15 cc. of sterile fluid were withdrawn and 11 cc. of anti-meningitis serum were injected. The following day his temperature again reached 104 by evening. His general condition, however, continued good, and it was felt that, since the left ventricle had been cleared up, the infectious process was going on in the right ventricle, and that the connection between the two was undoubtedly closed by exudate or an inflammatory process, and it was decided the following morning to enter the right ventricle. Dr. Mixer trephined this time over the anterior part of the ventricle, slightly to the right of the median line in the posterior part of the frontal region. The ventricle was tapped and 25 cc. of an opalescent fluid under strong pressure were removed, which again gave a strong growth when incubated. Twenty-two cc. of the serum were injected. Again, a small amount of clear fluid was withdrawn by lumbar puncture. Following this operation, the temperature again rose to 104 in the afternoon. The following day the temperature

continued high, and in the evening the right ventricle was tapped again and 40 cc. of sterile clear fluid were withdrawn and 30 cc. of serum injected. At the same time 12 cc. of fluid were withdrawn by lumbar puncture and 10 cc. of serum injected. Following this, he continued to show some general improvement, rested quietly most of the time, complained less of headache, but his temperature, while remaining lower, still showed an irregular course. Owing to the persistence of the symptoms, it was decided to do another intraventricular puncture, and as the patient showed considerable exhaustion and was rather dull and somnolent, it was attempted under local anesthesia. On this occasion a new trephine opening was made in the posterior frontal region, over the left ventricle. The patient bore the operation well, with but little shock and a minimum amount of actual pain. Forty cc. of clear sterile fluid were withdrawn and 25 cc. of serum injected. During the process of trephining, his pulse rose to 164, and suddenly dropped to 80 when the fluid was withdrawn, but as soon as the serum was injected his pulse rose to 124. He complained of headache at the end of the withdrawal of the fluid and also after more than 25 cc. of the serum had been injected. This headache was relieved after the excess of the serum was withdrawn.

Following this operation the patient's general condition improved steadily. While he continued to have a slight elevation of temperature occasionally, he became much brighter, his headache was relieved almost entirely, and when present it was very intense for a short time and then would cease suddenly. As an extra precaution, on June 7 a lumbar puncture was made and 20 cc. of sterile fluid were withdrawn and 10 cc. of serum injected. Examination by Dr. Lord of the eyes and ears at this time showed them again to be practically negative.

In addition to the serological treatment, he was treated by full feeding, at first with chiefly liquid diet, then with solids also, and with large amounts of fluid. There was free catharsis with enemata, ice-bag to the head and internally urotropin and occasionally small amounts of aspirin. During the first few weeks of his illness there was a well-marked polyuria. On several days he passed more than 100 oz. of urine, and it was frequently necessary to catheterize him. On the 7th day of his illness he developed an orchitis, which lasted for about a week and gradually subsided. About a week after the last intraventricular treatment he developed an arthritis (serum disease) which was first noticed in the knees, then the hips, shoulders, elbows and wrists. The pain was quite severe. There was no redness or swelling and the inflammation lasted a few days only in each of the joints, except in the wrists, where the pain was more intense and the duration a few days longer. There were no typical skin lesions at any time, except for the eruption in the dependent parts previously described, and a slight erythema of the ankles about the 4th day of the disease. The stiffness of the neck was noticeable throughout the worst part of his illness, but it gradually disappeared, as well as Kernig's sign. There was partial deafness of both ears during the time of his illness. The hearing in the left ear, however, returned rapidly, though even after recovery the hearing in the right ear had not completely returned. The left facial palsy, which was more or less prominent during his illness, gradually disappeared

during convalescence and left no trace. His vision was at no time seriously affected.

On admission there was considerable albumen in the urine with some red corpuscles and hyalin and granular casts, but these disappeared by the middle of May.

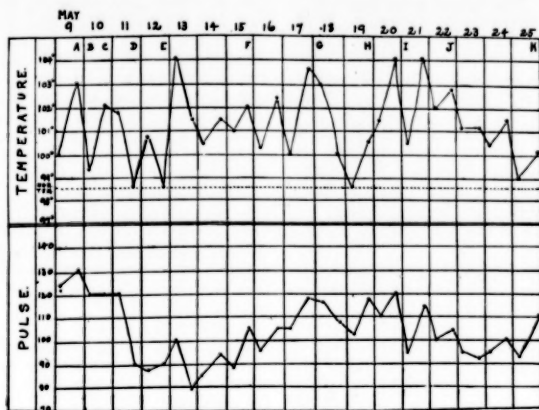
Mentally, there were frequent changes, with comparatively steady improvement, however. He was sometimes quite delirious, disoriented, thinking himself on shipboard, giving directions, having visual and probably auditory hallucinations; within an hour or two he might be quite dull and stuporous, or comparatively clear, recognizing and naming those about him, knowing he was at the McLean Hospital, and trying to cooperate in every way. At such times he would talk quite rationally for a few minutes, showing good orientation and appreciation of his situation. This might be followed by some remark wholly inconsistent with such orientation. He sometimes appreciated these lapses and commented on them. Occasionally he was quite talkative. The periods of complete clearness and orientation increased in length, but even as late as the middle of June, when superficially he seemed perfectly oriented, he occasionally made some wandering remark, which he, however, recognized later as absurd.

During his early convalescence he seemed a trifle dull and sluggish, and not as wide awake as one would expect of a man of his accomplishments, though as he became stronger he became brighter and more alert, and for some time before his discharge he was considered entirely natural by his family. Except for a nerve deafness of the right ear, he was fully recovered upon his discharge from the hospital July 21, 1917.

About the first of December he reported that he felt perfectly well, that he had just passed his medical examination, and that he had been ordered to his ship to report for duty at once, and at present he is presumably with his ship in his former capacity.

While the suggestion has been made by various writers that, on the ground of ventricular block or an obstructive internal hydrocephalus, intraventricular injection of serum appeared to be a rational plan of treatment, no one undertook to treat cases in this manner except in children or in adults in *extremis*. The necessity for intraventricular treatment must be at once recognized and begun early, before a walling-off takes place and before the inflammatory process has done permanent damage, if the treatment is to meet with any measure of success.

Intracranial injection of serum has been done frequently in infants through the fontanelles, and as early as 1908 Cushing and Sladen¹ reported a case of cerebrosplinal meningitis in a baby six months old. Five intraventricular punctures were made and serum injected. This was done late in the disease, and while the child seemed to progress favorably, it died after a sudden collapse. They suggest "that it may be advisable in other instances of ventricular obstruction in the acute stages of the disease, to perform, even in adults, ventricular punctures and, if organisms are present, to administer serum, with proper precautions, directly into the ventricle."



REFERENCE TO CHART.

FLUID WITHDRAWN BY LUMBAR PUNCTURE

A.	10 cc.
B.	22 "
C.	32 "
D.	30 "
E.	35 "
F.	14 "

INTRASPINAL SERUM INJECTION

.....	15 cc.
.....	25 "
.....	30 "
.....	7 "

FLUID WITHDRAWN FROM VENTRICLES

G. Left Ventricle, 15 cc.	
H. " " 15 "	
I. Right " 25 "	
J. " " 40 "	
K. Left " 40 "	

INTRAVENTRICULAR SERUM INJECTION

.....	10 "
.....	11 "
.....	22 "
.....	30 "
.....	25 "

In a recent issue of the *Journal of the American Medical Association*, Flexner² presents a complete résumé of our present conception of cerebrospinal meningitis. He speaks of the frequency of hydrocephalus which arises from interference with the escape of cerebrospinal fluid, usually infected with meningococcus, from the cerebral ventricles, through exudates which are plastered over the exits at the base of the brain. He also suggests that the serum might be safely and even efficiently introduced directly by ventricular puncture.

Chiray,³ in 1915, recognized that the failure of serotherapy in certain cases of meningococcus meningitis was due to the accumulation of pus in the ventricles of the brain, and while he did not attempt it, suggested that the pycephalus might be arrested by puncture of the ventricles, if done in time.

Netter's⁴ experience was not very encouraging. He treated 12 cases, all infants, intraventricularly, though none recovered. The only adult case he treated in this manner was a woman of 29, who received two intraventricular as well as intravenous injections of serum on the 93rd day of her illness. The patient seemed relieved, but died with symptoms suggesting anaphylaxis.

Labbé and Zislin⁵ injected 20 cc. of serum into the ventricles of an 11-year-old child suffering from walled-off meningitis, and four days later administered 8 cc. in a like manner. The injections were well borne and progressive improvement seemed to indicate recovery, but the patient died in syncope. They feel that if the operation had been performed earlier and on both sides, the treatment might have saved the patient.

Other writers refer to the possibilities of intracranial treatment in cerebrospinal meningitis, though in most of the reported cases this measure was employed too late.

We have in this case positive evidence of the therapeutic efficacy of anti-meningitis serum. The remarkable improvement in the patient's general condition immediately following each administration of serum was very striking, not only clinically, but its value was emphasized by the prompt disappearance of the micro-organism from the subarachnoid spaces and ventricles. The treatment must be controlled by bacteriological analysis of the spinal fluid and must be intensively followed up if the symptoms persist and the diplococci remain in the cerebrospinal fluid. After the spinal fluid has been sterile for some time intraspinal serum treatment is no

and ligamentous strain and so pain—therefore, when a person habitually stands with the body in a position of poor posture there is created a lack of normal muscle balance and consequently muscle strain, which is translated into pain. The so-called "carrying posture" is a good example of poor standing position. Here the trunk is carried back over the pelvis, the back is rounded and the abdomen protuberant, the low back hollow or flat. Poor postures are seen many times in poorly nourished young people who stand with a slight lateral curvature and a round back and shoulders, and who complain of backache. Other types are those individuals, women especially, who present on examination a hollow back with a marked increase in the normal inclination of the pelvis. Often there is a moderate degree of tenderness along the back muscles and over the sacro-iliac joints. A large number of these latter type of cases complain also of vague pains in the legs and feet. Into this class can be put also those obese individuals who have to lean back to balance themselves, and so by constantly putting extra work on their back muscles, tire them out and stretch their back ligaments and so strain their ligamentous insertions and may strain the sacro-iliac joints. These are best treated by a corset or belt which holds up the abdomen and takes the strain off the back and puts it on a brace or corset. An examination should be made to determine whether or not there is a short leg in all cases, for many cases of backache are due to an unrecognized short leg and can be cured by making the short leg as long as the other one. One other point of the greatest importance is the presence or absence of a short or tight heel cord. Normally, the foot should go about 10° beyond a right angle in dorsal flexion, but you will find that in many of these indefinite backache cases, dorsal flexion even to a right angle is not possible, and an attempt dorsally to flex the foot causes pain all along the back of the leg even extending to the buttock and back. This condition is probably part and parcel of the whole lack of proper muscle balance and posture, but its correction alone will often cure a troublesome and persistent backache. Associated with these tight heel cords, are often feet which are the reverse of flat, in that they present high arches and painful callosities on the balls of the feet. Stretching the heel cords several times a week, which relieves the so-called "wooden" feeling in the legs, with a specially designed machine, and taking the weight off the balls of the foot by means of a plate or an anterior heel, as devised by Dr. Cook of Hartford, which consists in a lift half an inch wide by an eighth to half an inch thick running across the sole of the shoe, just behind the ball of the foot. This acts as a wedge at that point and causes plantar flexion of the toes, and elevation of the metatarso-phalangeal joint and so relieves pain and pressure at that point; and

raising the heels of the shoes a quarter to a half an inch will often cure these cases. Raising the heels of the shoes will do several things. First, it will generally please the ladies who dread a low heeled, sensible shoe; therefore their pride is appeased and they begin to think that you are really quite sensible. Second, by so doing, you are taking the strain off the tight gastrocnemius muscle, and so relieving pain. Third, you are tipping the body back as a whole and consequently are relieving the tension on the irritated erector spinae group of muscles and letting up on their bowstring tension. The effect of these simple remedies in suitable cases is remarkable, and the relief from pain and discomfort marked often in 24 hours.

Certain patients I have seen always develop exquisitely tender areas about the buttocks and anus, when their posterior musculature becomes too tight, and one even develops, regularly, anal fissures which promptly clear up after stretching. It is needless to add that proper corsets, which support the strained back muscles and the abdomen well, should be supplied to all these cases. Such a corset should be no longer than the trochanter, should grip the pelvis firmly, should fit the back well, should be no higher than the top of the shoulder blades behind, and the lower ribs in front. It is better front laced, should have a flat abdomen, and is best applied lying down.

This type is common, and I believe they are often called cases of sacro-iliac strain, whereas, to my mind, they have no such condition. If they have the maximum amount of their discomfort over one or both sacro-iliac joints, associated with these other conditions, I believe that it has simply happened that the maximum strain has localized there, and that a strain of the sacro-iliac joint has developed secondarily and is not primary. They will get well under the above course of treatment plus rest and, later, exercises and massage.

There are also many cases of backache seen in poorly developed individuals, whose musculature is poor, whose resistance is low, and whose bodily posture is bad. These cases are the result of the same chain of events—namely, poor posture and lack of muscle development and balance, and are to be treated along the more general lines of developmental work. Many neurasthenics come into this class, but as a rule the backache seen in them is one which is distributed generally all over the back and rarely localized in any one spot.

2. Sacro-Iliac Strain or Sprain. This last class has been before us for a reasonably long time, and has been a popular one in which to put all cases of low backache. The joints have been there anatomically, the tenderness and pain has been situated at or about the joints, and the diagnosis is one easy to make offhand, without much of an examination, and satisfies both the doctor and the patient.

Now it is not to be denied that the sacro-iliac joints are real joints and are subject to such sprains and diseases as are other joints, but that all low backaches should come from these joints seems too good to be true. I think that the explanation offered above in the description of the postural backaches covers a good many so-called sacro-iliac strains. The strains and slippings of the sacro-iliac joint during and following pregnancy are common in everyone's experience and can generally be relieved by proper strapping and a good corset. One word of caution about strapping: always carry the plaster from in front of the anterior-superior spine on one side, to in front of it on the other, pulling it as hard as you can. Also put a felt pad about half an inch thick over the sacrum, extending up the lumbar spine, and you will get better results. Most strapping, as I see it, is inefficiently applied.

Sprains of the sacro-iliac joints are seen after sudden wrenches, especially when the person is bent forward and to the side. They seem to follow twisting strains rather than direct ones, either in the upright or flexed position. Certain cases are accompanied by local swelling and tenderness and, although increased motion and slipping can rarely be detected and the x-rays invariably in my experience prove negative, there is no doubt as to the condition. Associated with these sacro-iliac strains one usually finds more or less pain and discomfort down the back of the leg on the affected side, extending often to the foot and calf. As the condition in the joint improves, this pain in the leg gets well. This is attributed to the pressure on the nerves of the sacral plexus, which lie on the anterior surface of the joint in the pelvis, as shown by Albee⁵ and others. This nerve involvement is, I believe, not due to a pressure of the slipping joint, which cannot slip enough to cause such pressure, but may be due to local congestion which involves the tissues about the sacral cord. Slipping in the joint is, I believe, rare in the usual run of cases, and is observed only in those cases where ligamentous relaxation is great, such as is seen after pregnancy and in certain other cases of long duration of poor posture and back strain in rather fat people. I have seen only two such cases where the slipping could be felt, both in obese washwomen, who were so incapacitated finally, that in order to get out of bed they had to roll on to the floor and then climb up on themselves much in the same way a case of Pott's disease or progressive muscular atrophy gets up from the prone position. They were both promptly relieved by strapping and, later, corsets. Certain cases of acute sacro-iliac sprain, often seen following exposure and resembling an infectious or rheumatic attack, exhibit the greatest degree of pain and disability. Slipping of the joint cannot be demonstrated, but is felt and described by the patient when it occurs, generally with a twist of the body; the pain is excruciating and often accompanied with nausea or faintness. There is gen-

erally some pain down the leg on the affected side, and local tenderness over the joint. There is no mistaking these cases, for the picture is generally complete. Salicylates, rest and strapping often give relief in a few days, plus manipulation in a certain number of cases.

In about 80 cases of painful backs, seen for the Massachusetts Industrial Accident Board, in the last year or two, as the result of injuries, there was only one or two which seemed to be cases of sacro-iliac sprains as against 24 cases of compression fracture of the vertebrae; which is a most common condition and one frequently overlooked.

Two other points in connection with sacro-iliac slipping—relaxation and strain, which I wish to emphasize. First, when there is a real looseness or sprain of these joints, the patient always states that he feels as if he were "breaking in two." This is a common statement and I believe applies to no other condition. Second, in regard to the so-called leg-raising test, so commonly used, I believe it is fallacious, for this reason. Any injury to the lower back which results in back strain causes muscle irritability, which of itself will limit leg-raising with the lower leg extended. This is especially true in the static type of cases and should no more be regarded as a sign of sacro-iliac strain than of flat-foot. It is too frequently associated with other back conditions to be pathognomonic of any one of them.

A word of caution about back pain—never be content with an examination which does not include an x-ray, especially in cases of trauma. It is not difficult to have one made, and will reduce the percentage of guessing and raise the percentage of correct diagnoses.

REFERENCES.

- ¹ Hutchins, H. T.: The Role of the Anteponed Uterus in the Causation of Backache and Pelvic Symptoms, *J. A. M. A.*, Sept. 23, 1916, Vol. lxvii, No. 13.
- ² Graves, W. P.: *Amer. Jour. Orthop. Surg.*, December, 1917, Vol. xv, No. 12.
- ³ MacFarlane, Catharine: *J. A. M. A.*, March 31, 1917, Vol. lxviii, No. 13, p. 1000.
- ⁴ Reynolds, Edward, and Lovett, R. W.: An Experimental Study of Certain Phases of Chronic Backache, *J. A. M. A.*, March 26, 1916, p. 1033.
- ⁵ Albee, Fred H.: Study of the Anatomy and the Clinical Importance of the Sacro-Iliac Joint, *J. A. M. A.*, Oct. 16, 1909, Vol. lili, p. 1273.

Clinical Department.

A CASE OF CEREBROSPINAL MENINGITIS SUCCESSFULLY TREATED BY INTRASPINAL AND INTRAVENTRICULAR ADMINISTRATION OF ANTI-MENINGITIS SERUM.*

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THE following case of cerebrospinal meningitis presents several features of unusual interest both clinically and therapeutically. In

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particular, it emphasizes the need of intensive treatment with anti-meningitis serum, not only intraspinally, but if indicated, as in this case, intraventricularly.

The case is that of a naval lieutenant who was brought to the McLean Hospital May 6, 1917, in a delirious condition, the previous history of which was unknown, even to the immediate family, the patient having arrived at his home in a state of collapse and confusion on the morning of the day of his admission to the hospital, unable to give any account of his experiences up to that time. Later, however, facts came to light which are embodied in the following more detailed history.

The family history shows that the paternal grandmother died of a cancer of the throat. The father died of a cancer of the bladder after the patient's discharge from the hospital. His mother died of cerebrospinal meningitis a week after the patient's admission to the McLean Hospital, having contracted the disease from him after an exposure of a few hours while he was at home, just before his admission to the hospital.

The patient, who is 31 years old, was thought to have had spinal meningitis at the age of 6 months, having had several convulsions for 24 hours. Since that time there has been, however, nothing to suggest the presence of epilepsy or other nervous disorders.

His early life was uneventful. He was appointed to the Naval Academy at Annapolis, from which he graduated in 1907. After graduation he progressed rapidly in the service, and at 21 was given command of a vessel. Some time later he was recommended for promotion, and when taken sick was chief signal officer on the flagship of the squadron.

In January, 1917, he had a severe attack of ptomaine poisoning while attending an official banquet in Haiti. For several days he was in a critical condition. He recovered from the immediate effect of this illness, but did not fully regain his normal strength, though he was able to resume his work. Aside from this illness and its after-effects, he has always been in excellent health.

He was stationed with the fleet when he became sick, and left his ship presumably on May 4 on a 10-days' leave of absence because he felt somewhat nervous and run down. Upon reaching New York he became very ill, but with assistance was able to go from his hotel to take the midnight train for Boston. Before leaving, he wired his family that he would be home the following morning. Reaching Boston, he took a taxicab for his home, and on his arrival was so sick that he had to be helped into the house. After getting into the house he said he was sorry to come home sick, but that he was a nervous wreck and had fainted just after sending the telegram. He appeared to have a chill and went to bed. He seemed dazed and complained of a terrible headache and rubbed his head and moved about very restlessly.

At one o'clock he began to get excited, and thrashed around so much that he broke down the bed and neighbors were called to help care for him, and when the physician arrived at his home he found the patient dazed, pale and much excited. His pupils were equal and the reflexes were normal. He had no fever. He was given some citrate of magnesia and vomited. A quarter of a grain of morphia was given, and at 2 o'clock he was quiet. A little later he became excited again, and a quar-

ter of a grain of morphia and 1/100 of a grain of hyoscin were given, after which he slept.

He was brought to the hospital about 4 o'clock on the afternoon of May 6, well under the influence of hypnotics, and slept for nearly two hours. When seen by the physician, a little after admission, he could not be aroused, was limp and perspired freely. His pulse was 72, of good quality, but quite irregular; respirations were slow and deep. There was questionable rigidity of the neck, but he was so resistive that this could not be accurately determined and was, if present, not constant. The pupils were about 3 mm. in diameter; the left seemed a little larger than the right. They responded to flashlight. The reflexes were everywhere active and equal. At this time a definite Babinski was obtained on the right, but this later disappeared. There was also considerable resistance offered when the leg was raised after the thigh had been flexed. The abdomen seemed quite hard. There was an abrasion of the skin extending along the spine in the lower dorsal and upper lumbar region. He was catheterized and 16 oz. of urine were withdrawn.

During the night he was less somnolent and began making restless efforts to get out of bed. The following morning his temperature was 97 and the pulse 88, and throughout the day he remained delirious, talked about being aboard ship, asking if shell and powder were ready, etc. Momentarily he was clear and made normal responses, and he continued to complain of severe pain in the center of his head and in his back. His temperature remained sub-normal until night, when it rose to 101.8.

On the 8th he appeared very sick. He was rather dull and only semi-conscious. Talking with him seemed to increase his restlessness, which was at all times present. He was not resistive, and complied as well as he could with requests, and always tried to be polite and pleasant. He kept up more or less of a fragmentary talk as he moved about. He apparently tried to answer questions but did not seem able to. Only now and then in his delirium could a relevant response be obtained. Physical examination on this day showed a slight left facial palsy. The left corner of the mouth did not close completely. The tongue pointed to the right. The left cheek seemed fuller than the right. The eyes were prominent, and the tension of the right was possibly a little greater than that of the left. Both pupils reacted promptly to flashlight and accommodation. The left was distinctly larger than the right. The reflexes were everywhere present and active. As far as they could be elicited, there appeared to be no sensory disturbances. There was no ankle clonus, no Babinski and no Kernig's sign. The skin over both the elbows, the knees and buttocks was covered by a punctate eruption. Wassermann examination of the blood was negative. Throughout the day he continued much confused and rambling in his conversation.

On the 9th his condition grew rapidly worse. He was usually delirious, often somnolent, but occasionally cleared enough to give some rational responses. He tried to cooperate when the nurse attended him, but would immediately become stuporous. He appeared to be suffering continuously from severe headache.

In the evening he seemed very weak, and symptoms of meningitis were quite evident. Though he had been passing considerable urine during the day, he was catheterized and 32 oz. of urine were

withdrawn. A little later his neck seemed rather rigid, and temperature, pulse and respiration remained high. His pulse became weak, the stupor became deeper, respiration became irregular and shallow, at times distinctly of the Cheyne-Stokes type, and he seemed to be failing rapidly. Dr. W. Jason, Mixer was called in consultation, and at 11 p.m. a lumbar puncture was made under primary ether and 10 cc. of a cloudy fluid were withdrawn. Examination of the fluid by Dr. Frederick T. Lord showed the presence of meningococci. At 2 a.m., May 10, Dr. Lord, under primary ether, withdrew 22 cc. of a cloudy fluid and injected 16 cc. of anti-meningitis serum. Almost immediately after the first withdrawal of fluid the patient seemed to rally somewhat. After the injection of the serum his general condition as to heart action and respiration improved, though he remained semi-conscious until about 5 a.m., when he awoke and talked quite naturally with his mother. About an hour later he talked clearly with the nurse and dictated a perfectly coherent, well-expressed and moderately long letter to a superior naval officer. He called the nurse by name and told as much as he could remember of events immediately preceding his sickness.

The next morning he was again stuporous, though his temperature had dropped and his pulse and respiration remained high as before. He could be roused a little, but could only indistinctly mutter a very few words, sinking quickly into unconsciousness again. At this time the asymmetry of the face was not so apparent; the pupils were small and equal and the reflexes showed nothing abnormal. At 9 p.m., under primary ether, 32 cc. of a cloudy fluid were withdrawn by lumbar puncture and 25 cc. of anti-meningitis serum were injected. The cultures of the fluid gave a heavy growth of the diplococcus intracellularis.

On the following day his condition showed improvement, but he was somnolent much of the time. When awake he complained of pain in the back and slight headache. His temperature dropped to normal and the pulse and respiration showed a corresponding improvement. At 7 p.m., 30 cc. of fluid were removed by lumbar puncture, and 25 cc. of serum injected by Dr. Lord. This was attempted under novocaine, but upon injecting the serum the patient complained of very severe pain in the hips and legs, and primary ether anesthesia had to be resorted to. The withdrawn fluid proved to be sterile. Following this operation, the patient's condition again showed rapid improvement. During the night he again developed a slight febrile reaction, though his fever dropped to normal at noon on the 12th.

In the evening his temperature was again somewhat elevated, and under local anesthesia 35 cc. of a cloudy, somewhat bloody, fluid were obtained by spinal puncture, and 30 cc. of serum were again injected under primary anesthesia. For several hours the temperature rose, reaching 104 at midnight. He was very restless and delirious during the night, but during the following day slept for an hour or so from time to time. An examination by Dr. Lord of the fundus of both eyes was practically negative except for slight blurring of the discs. Examination of the ears, likewise, showed nothing abnormal.

The following day his temperature was again elevated and there was very little change in his general condition. On the 15th the situation was

about the same. His temperature continued high and irregular, severe headaches continued on and off and the delirium persisted. While he was not losing ground, he was not making much progress.

On the 15th, a lumbar puncture was again made and 14 cc. of a clear fluid were withdrawn and 7 cc. of serum were injected. While clinically this was followed by a temporary improvement, the delirium and irregular temperature persisted for the next few days. The withdrawn fluid was sterile, and it was evident that no further progress could be made by spinal injections.

On the morning of the 18th his temperature again reached 103. His pulse was rapid and the respiration was about 30. With the persistence of the fever and symptoms indicating intracranial pressure, it was very evident that the infection was continuing in the cerebral ventricles, and that the disease process had probably become walled-off. The patient's remarkably favorable reaction after each serological treatment intraspinally gave rise to the hope that if serum could be introduced directly into the ventricles a favorable reaction might be possible. Although precedent determined that in cases of this kind trephining should be a measure of last resort, it was felt that in this case any loss of time meant a fatal termination, or at best a chronic meningitis, and it was decided to operate without delay. On the morning of the 18th, under ether, a trephine opening was made 3 centimeters behind and above the left external auditory meatus; the left ventricle was tapped and 15 cc. of an opalescent fluid, under considerable pressure, were withdrawn. This was replaced by 10 cc. of anti-meningitis serum. The ventricular fluid was strongly infected with the meningococcus. At the same time 10 cc. of fluid were withdrawn by lumbar puncture. This was slightly yellow in color, but clear and sterile. The needle which was introduced into the ventricle was about the size of an ordinary needle used for lumbar puncture, though it was closed and rounded at the end, with two small lateral openings, thus avoiding any cutting of the cerebral tissue. The patient bore this operation very well. In the afternoon his temperature had dropped to 100, his pulse to 90, and it was of good quality. While he was somewhat confused he was free from headache. The following night he was rather restless. In the afternoon his temperature again suddenly rose to 101.5, and the ventricle was again tapped through the same opening; 15 cc. of sterile fluid were withdrawn and 11 cc. of anti-meningitis serum were injected. The following day his temperature again reached 104 by evening. His general condition, however, continued good, and it was felt that, since the left ventricle had been cleared up, the infectious process was going on in the right ventricle, and that the connection between the two was undoubtedly closed by exudate or an inflammatory process, and it was decided the following morning to enter the right ventricle. Dr. Mixer trephined this time over the anterior part of the ventricle, slightly to the right of the median line in the posterior part of the frontal region. The ventricle was tapped and 25 cc. of an opalescent fluid under strong pressure were removed, which again gave a strong growth when incubated. Twenty-two cc. of the serum were injected. Again, a small amount of clear fluid was withdrawn by lumbar puncture. Following this operation, the temperature again rose to 104 in the afternoon. The following day the temperature

continued high, and in the evening the right ventricle was tapped again and 40 cc. of sterile clear fluid were withdrawn and 30 cc. of serum injected. At the same time 12 cc. of fluid were withdrawn by lumbar puncture and 10 cc. of serum injected. Following this, he continued to show some general improvement, rested quietly most of the time, complained less of headache, but his temperature, while remaining lower, still showed an irregular course. Owing to the persistence of the symptoms, it was decided to do another intraventricular puncture, and as the patient showed considerable exhaustion and was rather dull and somnolent, it was attempted under local anesthesia. On this occasion a new trephine opening was made in the posterior frontal region, over the left ventricle. The patient bore the operation well, with but little shock and a minimum amount of actual pain. Forty cc. of clear sterile fluid were withdrawn and 25 cc. of serum injected. During the process of trephining, his pulse rose to 164, and suddenly dropped to 80 when the fluid was withdrawn, but as soon as the serum was injected his pulse rose to 124. He complained of headache at the end of the withdrawal of the fluid and also after more than 25 cc. of the serum had been injected. This headache was relieved after the excess of the serum was withdrawn.

Following this operation the patient's general condition improved steadily. While he continued to have a slight elevation of temperature occasionally, he became much brighter, his headache was relieved almost entirely, and when present it was very intense for a short time and then would cease suddenly. As an extra precaution, on June 7 a lumbar puncture was made and 20 cc. of sterile fluid were withdrawn and 10 cc. of serum injected. Examination by Dr. Lord of the eyes and ears at this time showed them again to be practically negative.

In addition to the serological treatment, he was treated by full feeding, at first with chiefly liquid diet, then with solids also, and with large amounts of fluid. There was free catharsis with enemata, ice-bag to the head and internally urotropin and occasionally small amounts of aspirin. During the first few weeks of his illness there was a well-marked polyuria. On several days he passed more than 100 cc. of urine, and it was frequently necessary to catheterize him. On the 7th day of his illness he developed an orchitis, which lasted for about a week and gradually subsided. About a week after the last intraventricular treatment he developed an arthritis (serum disease) which was first noticed in the knees, then the hips, shoulders, elbows and wrists. The pain was quite severe. There was no redness or swelling and the inflammation lasted a few days only in each of the joints, except in the wrists, where the pain was more intense and the duration a few days longer. There were no typical skin lesions at any time, except for the eruption in the dependent parts previously described, and a slight erythema of the ankles about the 4th day of the disease. The stiffness of the neck was noticeable throughout the worst part of his illness, but it gradually disappeared, as well as Kernig's sign. There was partial deafness of both ears during the time of his illness. The hearing in the left ear, however, returned rapidly, though even after recovery the hearing in the right ear had not completely returned. The left facial palsy, which was more or less prominent during his illness, gradually disappeared

during convalescence and left no trace. His vision was at no time seriously affected.

On admission there was considerable albumen in the urine with some red corpuscles and hyalin and granular casts, but these disappeared by the middle of May.

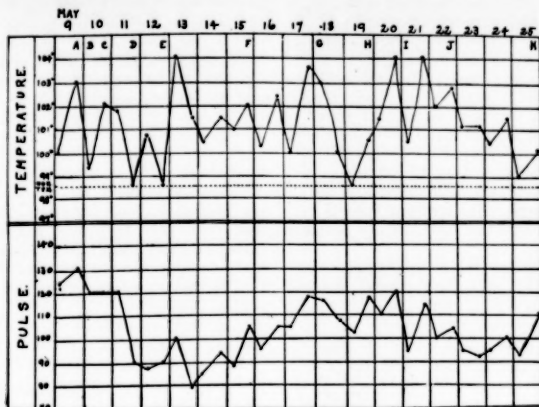
Mentally, there were frequent changes, with comparatively steady improvement, however. He was sometimes quite delirious, disoriented, thinking himself on shipboard, giving directions, having visual and probably auditory hallucinations; within an hour or two he might be quite dull and stuporous, or comparatively clear, recognizing and naming those about him, knowing he was at the McLean Hospital, and trying to cooperate in every way. At such times he would talk quite rationally for a few minutes, showing good orientation and appreciation of his situation. This might be followed by some remark wholly inconsistent with such orientation. He sometimes appreciated these lapses and commented on them. Occasionally he was quite talkative. The periods of complete clearness and orientation increased in length, but even as late as the middle of June, when superficially he seemed perfectly oriented, he occasionally made some wandering remark, which he, however, recognized later as absurd.

During his early convalescence he seemed a trifle dull and sluggish, and not as wide awake as one would expect of a man of his accomplishments, though as he became stronger he became brighter and more alert, and for some time before his discharge he was considered entirely natural by his family. Except for a nerve deafness of the right ear, he was fully recovered upon his discharge from the hospital July 21, 1917.

About the first of December he reported that he felt perfectly well, that he had just passed his medical examination, and that he had been ordered to his ship to report for duty at once, and at present he is presumably with his ship in his former capacity.

While the suggestion has been made by various writers that, on the ground of ventricular block or an obstructive internal hydrocephalus, intraventricular injection of serum appeared to be a rational plan of treatment, no one undertook to treat cases in this manner except in children or in adults in *extremis*. The necessity for intraventricular treatment must be at once recognized and begun early, before a walling-off takes place and before the inflammatory process has done permanent damage, if the treatment is to meet with any measure of success.

Intracranial injection of serum has been done frequently in infants through the fontanelles, and as early as 1908 Cushing and Sladen¹ reported a case of cerebrospinal meningitis in a baby six months old. Five intraventricular punctures were made and serum injected. This was done late in the disease, and while the child seemed to progress favorably, it died after a sudden collapse. They suggest "that it may be advisable in other instances of ventricular obstruction in the acute stages of the disease, to perform, even in adults, ventricular punctures and, if organisms are present, to administer serum, with proper precautions, directly into the ventricle."



REFERENCE TO CHART.

FLUID WITHDRAWN BY LUMBAR PUNCTURE

A.	10 cc.
B.	22 "
C.	32 "
D.	30 "
E.	35 "
F.	14 "

INTRASPINAL SERUM INJECTION

15 cc.
25 "
25 "
30 "
7 "

FLUID WITHDRAWN FROM VENTRICLES

G. Left Ventricle, 15 cc.
H. " " 15 "
I. Right " 25 "
J. " " 40 "
K. Left " 40 "

INTRAVENTRICULAR SERUM INJECTION

10 "
11 "
22 "
30 "
25 "

In a recent issue of the *Journal of the American Medical Association*, Flexner² presents a complete résumé of our present conception of cerebrospinal meningitis. He speaks of the frequency of hydrocephalus which arises from interference with the escape of cerebrospinal fluid, usually infected with meningococcus, from the cerebral ventricles, through exudates which are plastered over the exits at the base of the brain. He also suggests that the serum might be safely and even efficiently introduced directly by ventricular puncture.

Chiray,³ in 1915, recognized that the failure of serotherapy in certain cases of meningococcus meningitis was due to the accumulation of pus in the ventricles of the brain, and while he did not attempt it, suggested that the pyocephalus might be arrested by puncture of the ventricles, if done in time.

Netter's⁴ experience was not very encouraging. He treated 12 cases, all infants, intraventricularly, though none recovered. The only adult case he treated in this manner was a woman of 29, who received two intraventricular as well as intravenous injections of serum on the 93rd day of her illness. The patient seemed relieved, but died with symptoms suggesting anaphylaxis.

Labbé and Zislin⁵ injected 20 cc. of serum into the ventricles of an 11-year-old child suffering from walled-off meningitis, and four days later administered 8 cc. in a like manner. The injections were well borne and progressive improvement seemed to indicate recovery, but the patient died in syncope. They feel that if the operation had been performed earlier and on both sides, the treatment might have saved the patient.

Other writers refer to the possibilities of intracranial treatment in cerebrospinal meningitis, though in most of the reported cases this measure was employed too late.

We have in this case positive evidence of the therapeutic efficacy of anti-meningitis serum. The remarkable improvement in the patient's general condition immediately following each administration of serum was very striking, not only clinically, but its value was emphasized by the prompt disappearance of the micro-organism from the subarachnoid spaces and ventricles. The treatment must be controlled by bacteriological analysis of the spinal fluid and must be intensively followed up if the symptoms persist and the diplococci remain in the cerebrospinal fluid. After the spinal fluid has been sterile for some time intraspinal serum treatment is no

longer indicated. The serum must come in direct contact with the infected area to be of any value, and must be introduced directly into the cavity where the micro-organisms are.

That this procedure was fully justified was evident immediately after the first cranial treatment. There was almost instant relief of the headache, the mental condition improved, and in spite of sterile spinal fluid, the left ventricle contained a cloudy fluid full of diplococci. The four following ventricular taps and serum injections were carried out without special incident or difficulty, and the results fully justified the means.

In this case no unfavorable symptom or shock followed trephining and intracranial medication; on the contrary, almost immediate alleviation of the symptoms was noticed. In fact, on one occasion, trephining was done and the serum introduced into the ventricles under local anesthesia, without any undue pain or shock, and with the advantage that the patient was conscious of intraventricular distention, and helped to control the amount of serum, which was introduced, by the degree of headache.

In fatal cases, autopsies have shown that the micro-organisms are almost invariably found in the cerebral ventricles. In this case the persistence of the symptoms indicated with certainty ventricular block, and that the process was going on in the ventricles.

Cases of cerebrospinal meningitis should no longer be considered as purely medical, and certainly when such cases reach general hospitals the question of surgical interference should be given early and careful thought.

The dread of brain surgery, in general, will undoubtedly deter many from recommending what appears to be a radical operation, the benefits of which are possibly in doubt. However, the procedure is in no way comparable to a major surgical operation on the brain, with its occasional disagreeable complications. A small trephine opening similar to that made for the purpose of intraventricular treatment for syphilis, which is now quite universally carried out, is all that is indicated. In cerebrospinal meningitis the disease is more acute, the treatment is more positive in its effects, and the operation is fully justified in the light of our present knowledge of the disease, where the symptoms indicate cerebral walling off.

Early intraventricular treatment might be expected to diminish the amount of pycephalus, and with less pus and exudate the dangers of closing important foramina, and thus causing a walling-off or hydrocephalus, may be prevented. It is a question of destroying the micro-organisms before they have had time to produce an intense inflammatory reaction or to have become inaccessible by becoming pocketed off.

Another feature of considerable importance, which throws some light on the infectious nature of the disease and on the period of incuba-

tion, of which there is much uncertainty, is the fact that the patient's mother, who was exposed only a few hours while he was at home, after three days developed cerebrospinal meningitis and died a few days later. The patient had not seen his mother for at least six months previous to this time. In most cases the source of the infection is difficult to trace, and cases of direct contagion, while not unknown, are somewhat uncommon. The necessity for strict isolation is, of course, apparent. In the case of the mother, the bacteriological examination of the spinal fluid positively identified the disease, although clinically there was little to suggest it. She suddenly developed a stupor, and if it had not been for the history of exposure the case might have escaped notice.

I desire to express my indebtedness and thanks to Drs. F. T. Lord and W. J. Mixer for their coöperation and valued counsel, which made it possible to bring this case to a successful conclusion.

REFERENCES.

- ¹ Cushing and Staden. *Jour. Exper. Med.*, 1908, Vol. x, p. 548.
- ² Flexner, Simon: *Jour. A. M. A.*, Vol. lxi, Nos. 9 and 10, Sept. 1 and 8, 1917.
- ³ Chiray: *Abst. in Jour. A. M. A.*, Vol. lxi, 1916, p. 153.
- ⁴ Netter, A.: *Abst. in Jour. A. M. A.*, May 13, 1916, p. 1586.
- ⁵ Labbé, Zidn and Cavallion: *Abst. in Jour. A. M. A.*, Vol. lxi, No. 18, Apr. 29, 1916, p. 1432.

Book Reviews.

Venesection. By WALTON FOREST DUTTON, M.D. Philadelphia: F. A. Davis Co.

This monograph is intended as "a brief summary of the practical value of venesection in disease for students and practitioners of medicine." It is illustrated by several text engravings and three full-page plates, one in colors. The initial chapter presents a history of blood-letting by Dr. Fielding H. Garrison, read before the Medical History Club of Washington, D. C., on December 30, 1911: following this the author continues with a study of blood and lymph hematology, pathologic anthropology and the indications and technic of venesection. The remainder, about three quarters, of the work is an alphabetic discussion of the conditions in which venesection may be of value, from alcohol to viscosity of the blood. Though it is doubtless true that venesection is a procedure of therapeutic value within relatively narrow limits, its encouragement or extensive, injudicious employment is to be regarded with great caution. In many instances the shock of hemorrhage overbalances the benefit that may be derived from lowered blood pressure or removal of toxins. It is to be noted that in his description of transfusion the author still advocates the more complicated technic of direct vessel anastomosis, rather than the simplified and highly preferable method developed by Kimpton and Brown. The volume closes with a valuable, though incomplete, bibliography of selected titles.

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ADVANCED RANK FOR MEDICAL OFFICERS.

THE Massachusetts State Committee has recently received from the Council of National Defense, Medical Section, at Washington, the following important letter relative to the Owen and Dyer bills, which deserves careful consideration and as much publicity as possible among the medical profession:

"1. The Owen bill, S. 3748, and the Dyer bill, H. R. 9563, creating advanced rank for officers of the Medical Corps, were introduced in the Senate and House of Representatives Tuesday, February 5. These two bills are identical and are similar to a bill passed some time ago, whereby advanced rank was granted to

medical officers in the Navy. According to the present law, the ranks for officers of the Medical Reserve Corps are first lieutenant, captain, and major. According to the Owen and Dyer bills, the ranks, in addition to those just noted, are lieutenant-colonel, colonel, brigadier-general, and major-general. The medical profession has long realized the importance of this advanced standing for physicians serving in the Army, and has felt the great value, to the health and welfare of soldiers, coming through orders given by medical officers of higher rank than those which are now accorded.

2. A recommendation involving the efficiency of the Army, because health is necessary to efficiency, given by a medical officer to a line officer of superior rank, fails to carry weight necessary for such an important recommendation. This has been the experience of many officers in the past, and has been responsible for this demand for advanced rank. The number in the regular Medical Corps now on active duty is 775. Volunteer physicians in the Medical Officers' Reserve Corps to the number of 12,855 are now on active duty. As you well know, physicians of the highest standing in the profession are now in the military service with the rank of major; the Army, therefore, losing the benefit of their experience and knowledge because of a lack of power to enforce their recommendations. Advanced rank carries with it this power.

3. The value of this patriotic service will be greatly enhanced by the early passage of these bills. If you feel, therefore, that more efficient service will be rendered after these bills become law, will you and your medical friends communicate directly with your senators and representatives, preferably by telegraph, using the 'night letter' service, if desired, giving them the benefit of your experience and advice. In matters medical, legislators are both willing and anxious to be guided by the wishes of the medical profession. Will you also present this information concerning these bills to the medical societies of your state and city for their consideration and action, such action to be in the nature of resolutions to be forwarded to senators and representatives as an evidence of the recommendation of the profession on this question?

By direction of DR. FRANKLIN MARTIN.

Committee on States Activities.

General Medical Board—Edward Martin, Chairman; John D. McLean, Secretary; Joseph C. Bloodgood, John Young Brown, Karl Connell, George W. Crile, Richard Derby, John M. T. Finney, Joseph M. Flint, William J. Mayo, Stuart McGuire, Col. R. B. Miller, U.S.A., Col. Robt. E. Noble, U.S.A., Charles H. Peck, Hubert A. Royster, Frederick T. Van Beuren, Jr.

Ex-officio Members—Franklin Martin, Member of Advisory Commission; F. F. Simpson, Chief of Medical Section."

VOLUNTEER MEDICAL SERVICE CORPS.

The Council of National Defense on February 27 authorized the following statement:

For the purpose of completing the mobilization of the entire medical and surgical resources of the country, the Council of National Defense has authorized and directed the organization of a "Volunteer Medical Service Corps," which is aimed to enlist in the general war-winning program all reputable physicians and surgeons who are not eligible to membership in the Medical Officers' Reserve Corps.

It has been recognized always that the medical profession is made up of men whose patriotism is unquestioned and who are eager to serve their country in every way. Slight physical infirmities or the fact that one is beyond the age limit, fifty-five years, or the fact that one is needed for essential public or institutional service, while precluding active work in camp or field or hospital in the war zone, should not prevent these patriotic physicians from close relation with governmental needs at this time.

It was in Philadelphia that the idea of such an organization was first put forward, Dr. William Duffield Robinson having initiated the movement resulting in the formation last summer of the Senior Military Medical Association with Dr. W. W. Keen as president—a society which now has 271 members.

Through the Committee on States Activities of the General Medical Board, the matter of forming such a nation-wide organization was taken up last October in Chicago, at a meeting attended by delegates from forty-six states and the District of Columbia. This committee, of which Dr. Edward Martin and Dr. John D. McLean—both Philadelphians—are, respectively, chairman and secretary, unanimously endorsed the project. A smaller committee, with Dr. Edward P. Davis of Philadelphia as chairman, was appointed to draft conditions of membership; the General Medical Board unanimously endorsed the committee's report; the Executive Committee, including Surgeons-General Gorgas of the Army, Braisted of the Navy, and Blue of the Public Health Service, heartily approved and passed it to the Council of National Defense for final action; and the machinery of the new body has been started by the sending of a letter to the State and County Committees urging interest and the enrollment of eligible physicians.

It is intended that this new corps shall be an instrument able directly to meet such civil and

military needs as are not already provided for. The General Medical Board holds it as axiomatic that the health of the people at home must be maintained as efficiently as in times of peace. The medical service in hospitals, medical colleges and laboratories must be up to standard; the demands incident to examination of drafted soldiers, including the reclamation of men rejected because of comparatively slight physical defects; the need of conserving the health of the families and dependents of enlisted men and the preservation of sanitary conditions,—all these needs must be fully met in time of war as in time of peace. They must be met in spite of the great and unusual depletion of medical talent, due to the demands of field and hospital service.

In fact, and in view of the prospective losses in men with which every community is confronted, the General Medical Board believes that the needs at home should be even better met now than ever. The carrying of this double burden will fall heavily upon the physicians, but the medical fraternity is confident that it will acquit itself fully in this regard, its members accepting the tremendous responsibility in the highest spirit of patriotism. It will mean, doubtless, that much service must be gratuitous, but the medical men can be relied upon to do their share of giving freely, and it is certain that inability to pay a fee will never deny needy persons the attention required.

It is proposed that the services rendered by the Volunteer Medical Service Corps shall be in response to a request from the Surgeon-General of the Army, the Surgeon-General of the Navy, the Surgeon-General of the Public Health Service, or other duly authorized departments or associations, the general administration of the corps to be vested in a Central Governing Board, which is to be a committee of the General Medical Board of the Council of National Defense. The State Committee of the Medical Section of the Council of National Defense constitutes the Governing Board in each State.

Conditions of membership are not onerous, and are such as any qualified practitioner can readily meet. It is proposed that physicians intending to join shall apply by letter to the secretary of the Central Governing Board, who will send the applicant a printed form, the filling out of which will permit ready classification according to training and experience. The name and data of applicants will be submitted to an Ex-

Executive Committee of the State Governing Board, and the final acceptance to membership will be by the national governing body. An appropriate button or badge is to be adopted as official insignia.

The General Medical Board of the Council of National Defense is confident that there will be a ready response from the physicians of the country. The Executive Committee of the General Medical Board comprises: Dr. Franklin Martin, chairman; Dr. F. F. Simpson, vice-chairman; Dr. William F. Snow, secretary; Surgeon-General Gorgas, U.S.A.; Surgeon-General Braisted, U. S. Navy; Surgeon-General Rupert Blue, Public Health Service; Dr. Cary T. Grayson, Dr. Charles H. Mayo, Dr. Victor C. Vaughan, Dr. William H. Welch.

STATE DEPARTMENT OF HEALTH DRUG BILL.

IN the issue of the JOURNAL for February 14, (page 231) we commented editorially on a bill (House No. 213), then pending before the Massachusetts General Court, relative to the sale and distribution of certain drugs, and aimed primarily at the surreptitious drug-store treatment of venereal diseases. This bill has now been withdrawn and for it has been substituted the following act "relative to the prescribing and compounding of certain drugs":

"Section 1. It shall be unlawful for any person, other than a physician registered under the laws of this commonwealth, to prescribe or recommend to any person any drugs, medicines or other substances to be used for the cure or alleviation of gonorrhea, syphilis or other venereal disease.

"Section 2. It shall be unlawful for any person to compound any drugs or medicines to be used for the cure or alleviation of gonorrhea, syphilis or other venereal disease, from any written or printed formula or order, or upon the prescription of any physician unless the said prescription is signed and dated by the said physician. No such prescription shall be received for filling more than fourteen days after its date of issue, as indicated thereon.

"Section 3. Any violation of the provisions of this act shall be punished by a fine of not more than one thousand dollars or by imprisonment in a house of correction or jail for a term not exceeding one year, or by both such fine and imprisonment."

The striking points of this new drug bill are that it forbids compounding medicines for the cure of venereal diseases except on a physician's prescription; that no prescription shall be received for filling more than 14 days after its date of issue; and that the use of printed formulae is forbidden. This prospective act, like the one which it replaces, may be regarded as an attempt, not only to protect the public, but to secure for them the most effective possible treatment for this group of ailments, and its passage is earnestly to be desired and advocated by the medical profession.

ANNUAL REPORT OF THE SURGEON-GENERAL, U. S. NAVY, 1917.

THIS comprehensive report contains very interesting and instructive information regarding the various branches of the Bureau of Medicine and Surgery of the Navy Department. A few paragraphs are devoted to important subjects, including the medical and dental corps, the American Red Cross, emergency hospital construction, Council of National Defense, aviation, the hospital corps, the nurse corps, schools, medical supply depots, hospital and ambulance ships, sanitary conditions ashore, naval hospitals, recruiting and health of the Navy; considering each subject in its relation to the Navy Department. The latter half of the report is given over to short tables illustrating the subtitles, and to long and detailed tables showing comparisons of diseases during several years and comparisons of mortality. These are followed by statistics which include a detailed statement of diseases and injuries for the calendar year 1916, the distribution among occupational groups, the deaths, invalidated from the service, surgical operations, dental operations, recruiting statistics, and the financial statement of the total cost of maintenance and average cost *per diem* for maintenance and subsistence at naval hospitals for the fiscal year 1917.

"For a considerable time prior to the declaration of war, and while yet this contingency seemed remote and improbable to many, this bureau instituted steps for preparation against such a development. The commanding officers of hospitals were directed to consider all the features of a possible situation calling for large increase in their equipment, and were directed to make tentative plans for installation of tents,

beds and cots to permit the maximum expansion. Plans were definitely completed for utilizing these institutions to their utmost capacity. Likewise, in the matter of stores, the bureau has been acquiring large quantities of drugs, surgical dressings, and appliances for issue from the various medical supply depots. The individual hospitals and ships also largely increased their reserve supplies, so as to be ready for any emergency.

In addition to the facilities thus provided and being provided in naval institutions, properly so called, the medical officers in command of the various naval hospitals have been busily engaged in organizing the naval hospital bases and arranging for adjuncts to them, such as civilian hospitals, municipal hospitals, private institutions, either to provide for evacuation on overflow of naval hospitals or to receive patients direct."

"Upon declaration of war the medical service to be rendered to all personnel of all forces was promptly organized in accordance with prepared plans, particularly with attention to naval districts and naval hospital bases. This organization consists of two divisions—dispensary service, general and hospital service, central.

The dispensary service, under the charge of the medical aid to the commandant of each naval district, was developed to serve the many outlying stations for patrol, aero, radio, and other forces. Dispensaries, or temporary sick quarters, were established, equipped, and manned with proper personnel at all places where the need existed.

The hospital service, under the charge of the medical officer in command of the naval hospital in each district, was developed upon a naval hospital base, the established naval hospital being surrounded by adjuncts in the form of temporary structures, tents, buildings converted to hospital purposes, United States Public Health Service or civil hospitals, to accommodate patients for whom, for any reason, there might be no accommodations within the naval hospital itself. The medical officers in charge of both divisions of medical work have perfected the general plans, and have made complete arrangements at all stations for adequate care and treatment of the sick and wounded should they be received in large numbers."

"Work has been rapidly pushed on all construction, and many of the emergency hospital buildings are equipped and fully ready for occupancy. The expansion of the hospitals has resulted in a great increase of work for the chief nurses of hospitals, and greater efficiency would result from the appointment of an assistant chief nurse at each hospital, with an increase of pay proportionate to the duties which would be indicated in this position. A field of activity which has been developed during the past year has been the class work in connection with the

instruction of hospital corpsmen, and especially qualified nurses have been appointed with a view to systematizing the method of instruction in the various naval hospitals."

"The work of the Sanitary Division extends to the field. An officer of the Public Health Service is detailed to each naval district, where his principal function is to study and direct sanitary measures in the regular naval establishments and their environments."

It is impossible to quote from this report sufficient of the valuable statements to show the distinct value of the publication. One can only recommend that it is worthy of a careful perusal.

THE NEW HEALTH COMMISSIONER OF MASSACHUSETTS.

IN the issue of the JOURNAL for February 21 we published comments on the loss the State had sustained in the return of Health Commissioner Allan J. McLaughlin to Washington, to become Assistant Surgeon-General in the United States Public Health Service, he having been loaned to Massachusetts in 1914 to inaugurate new methods, and to put our health department on a different footing. The Governor has nominated and the Council confirmed the appointment of Dr. Eugene Robert Kelley, who is now the commissioner, being advanced from the position of director of the Department of Communicable Diseases in the department. Dr. Kelley was a graduate of the Medical Department of the Johns Hopkins University and an interne at the Carney Hospital. Thence he went to the State of Washington to become assistant health commissioner and then commissioner of health, so that he assumes now a similar office in Massachusetts. That he has shown commendable energy in the conduct of the Department of Communicable Diseases is common knowledge, and there is every reason to believe that he will continue the policies of his predecessor, thus maintaining the high standards and best traditions of state service to the public health, for which Massachusetts has long been famous. The Governor and the citizens of the State are to be congratulated on this wise appointment.

MEDICAL NOTES.

DISTRIBUTION OF BLANK FORMS FOR THE NOTIFICATION OF CASES OF SYPHILIS AND GONORRHEA.—Owing to freight embargoes and the seizure of paper by the U. S. Government designed for the printing of certain of the forms to be used in notifying the State Health Department of cases of syphilis and gonorrhea, the printer was unable to fill his contract to supply this Department with the full quantity of the necessary forms in time to distribute them to physicians throughout the Commonwealth prior to February 1, 1918, when these diseases became reportable. As quickly as the various lots of the necessary supplies are delivered to this office, however, they are sent out, and it is hoped that by the fifteenth of March all registered physicians in the State will have received the requisite blank forms for the handling of reports of cases of syphilis and gonorrhea.

EUGENE R. KELLEY, M.D.,
Commissioner of Health.

PREVALENCE OF TUBERCULOSIS IN THE UNITED STATES.—On February 25 the National Association for the Study and Prevention of Tuberculosis issued in New York a statement to the effect that within the next two years at least 50,000 more tuberculosis hospital beds will be needed in the United States to make possible the adequate control of the disease under war conditions. At present only 43,000 beds are available for this purpose in the entire country.

"The estimate is based on a revised conception of the prevalence of the disease, as the result largely of the examination of recruits and drafted men for our new Army and Navy. Until recently it was estimated that for every death from tuberculosis in the country there were five active cases of the disease. It is now believed that the true ratio is twice or three times as great. Instead of about 1,000,000 active cases in the country, there are probably between 2,000,000 and 3,000,000.

These results are corroborated, says the statement, by unofficial deductions from the records of the first year of the community health demonstrations being carried on at Framingham, Mass., by the National Association. About 5000 persons, or about one-third of the population of Framingham, have been rigidly examined, including all classes, and out of these approximately 160 definite cases have been discovered.

The average annual death list in Framingham from tuberculosis is 15. If not another case of the disease should be found on examining the rest of the population, this would give a ratio of

disease to death twice as large as formerly estimated."

AWARD OF VICTORIA CROSS.—In the *Lancet* is noted the recent award of the Victoria Cross to the late Capt. John Fox Russell, M.C.R.A.M.C., attached to the Royal Welsh Fusiliers, "for most conspicuous bravery displayed in action until he was killed. Captain Russell repeatedly went out to attend the wounded under murderous fire from snipers and machine guns, and in many cases, where no other means were at hand, carried them in himself, although almost exhausted. He showed the highest possible degree of valor."

BRITISH BIRTH AND DEATH RATES.—On February 21 were published in London the vital statistics of England and Wales for 1916, showing a reduction of $4\frac{1}{2}\%$ in the marriage rate that year, and the lowest death rate ever recorded for children under one year of age.

"There was in 1916 a notable increase in the proportion of marriages of young widows under 30 years of age, which greatly increased result is due to the war. The proportion of the total population to the birth rate was 20.9 per 10,000 living. The reduction in births amounted to only 12%, whereas in Germany the fall is reported to have been 40% for the two years 1915-1916, and in Hungary 56%. In England and Wales the births of males numbered 402,137, of females 383,383. The report states it will be possible only after the war to determine to what extent the old idea that war conditions lead to male conceptions, has been justified by the huge experiment now in progress. The excess of births over deaths was 277,303. The number of fatal casualties incurred by English and Welsh troops during the year, says the report, must have been very much lower than 277,303, so the increase in population must have continued. German statistics record 1,331,000 deaths in 1916—apparently exclusive, at least, of the great majority of fatal war casualties—against 1,103,000 births. The Hungarian figures are for deaths not in action, 428,057, against 333,551 births."

WAR NOTES.

MEASLES QUARANTINE.—Five cases of measles among members of the Coast Artillery Guard units at the Waterships Branch of the Springfield Armory have caused the placing of the guard camp under strict quarantine.

TREATMENT OF SHELL SHOCK AT COLUMBIA UNIVERSITY BASE HOSPITAL.—Public announcement has been made that the United States Army Men's Hospital No. 1, better known as Columbia University Base Hospital, has already

harbored 650 patients. Plans are under way so that 5000 men may receive treatment there at one time. An experiment in the non-medical treatment of shell shock is under way. This consists of a concert which is designed to show the effect of music upon men whose nerves have been shattered by the high-tension strain of trench life, and who have thus been brought to any one of that variety of conditions described as "shell shock," although the term is not confined to the conditions brought on by the explosion of shells.

BOSTON AND MASSACHUSETTS.

JOHN WHITE BROWNE SCHOLARSHIP AT HARVARD.—A new medical scholarship has been established at Harvard under the will of Rebecca A. Greene, which is to enable a young man of unusual promise to pursue his research investigations for one year at Harvard or elsewhere. Eighteen thousand and five hundred dollars was given for this purpose in memory of John White Browne, who was a member of the Harvard class of 1830.

WEEK'S DEATH RATE IN BOSTON.—During the week ending February 23, the number of deaths reported was 298, against 295 last year, with a rate of 19.81, against 19.91 last year. There were 50 deaths under one year of age, against 31 last year.

The number of cases of principal reportable diseases were: diphtheria, 66; scarlet fever, 27; measles, 143; whooping cough, 35; typhoid fever, 2; tuberculosis, 59.

Included in the above were the following cases of non-residents: diphtheria, 8; scarlet fever, 5; measles, 1; typhoid fever, 1.

The total deaths from these diseases were: diphtheria, 11; scarlet fever, 1; measles, 2; whooping cough, 2; tuberculosis, 29. Included in the above were the following non-residents: diphtheria, 7; whooping cough, 1; tuberculosis, 2.

MASSACHUSETTS STATE NURSES' ASSOCIATION.—The midwinter meeting of the Massachusetts State Nurses' Association was held Saturday, February 16, 1918, in the Assembly Hall of the Walker Building, 525 Boylston Street, Boston. In the morning the Massachusetts State League of Nursing Education met at 10.30 and the Private Duty Nurses' League met at 12.30. The afternoon meeting was in charge of the State

League of Nursing Education, Miss Emma M. Nichols, R.N., presiding. Two papers were presented, "Plane of Training Schools in the Nursing World" and "Training of Student Nurses."

IN HONOR OF DR. McLAUGHLIN.—A dinner was given Thursday evening, February 21, in honor of Dr. Allan J. McLaughlin, who has resigned as commissioner of health in Massachusetts, in favor of an appointment as Assistant Surgeon-General in charge of Division of Interstate Quarantine in Washington. Dr. McLaughlin was assigned to Massachusetts by the United States Public Health Service four years ago, to direct the reconstruction of the State Department of Health from an unpaid board to the more modern system of public health administration, which places the functions of the State Department of Health under the control of one executive with an advisory council.

HOSPITAL BEQUEST.—By the will of the late Mrs. Maria Louise Harlow Peirce, a bequest of \$100,000 is made which is to be used as a fund for the erection of a hospital in Middleboro, Mass. This hospital is to be known as St. Luke's Hospital and the fund is to go under the designation. "The Harriet Rice, Judith Peirce and Nabby Sproat Peirce Memorial Fund."

Obituary.

HARRY MADISON CUTTS, M.D.

DR. HARRY MADISON CUTTS died of pneumonia at his home in Brookline, February 21, 1918. He was a native of Washington, D. C., where he was born September 4, 1858, the son of Richard D. and Martha Jefferson Hackley Cutts. In 1880 he was graduated from Princeton with the A.B. degree and in 1883 from Harvard Medical School, Princeton giving him an A.M. the same year.

From 1885 until 1887 Dr. Cutts practised his profession in Washington, and since then he had lived and practised in Brookline. While in Washington he was, in 1884, superintendent of the Garfield Memorial Hospital. In his professional career Dr. Cutts had served as surgeon for the Naval Brigade, M.V.M., and at the time of his death he was medical examiner of Norfolk County. He was a member of the Massachusetts Medical Society and was the medical mem-

ber of the draft selection board in Brookline, where he belonged to the Thursday Club and the Country Club. He was married in Randolph, on November 18, 1891, to Marion Belcher, by whom he is survived, as he is by a daughter, Dorothy Madison Cutts, and a son, George Belcher Cutts, who is in service in the Aviation Corps.

Miscellany.

REHABILITATION OF DISABLED SOLDIERS AND SAILORS.

I.

THAT 100,000 out of every 1,000,000 soldiers sent overseas will return to the United States during the first year of fighting, and that 20,000 of these will need some kind of vocational re-education or rehabilitation, is the estimate made by the Federal Board for Vocational Education in a report just published as Senate Document 166.

"Long before the close of activities in the summer of 1918, the return of men will begin, and vocational re-education must start with the first men sent back, and must be developed as the number of men in hand for training increases," declares the report. "The development of facilities for undertaking vocational re-education must, in fact, anticipate the return of the men, since adequate provision cannot be improvised after the men are actually in hand for training."

A comprehensive federal system for the re-education and placement in wage-earning occupations of every disabled soldier and sailor is presented by the federal board. This plan involves a central administrative agency at Washington, the coordination with that agency of every federal and state agency concerned and with similar public, semi-public and private agencies, the establishment of "curative workshops" for the treatment of war cripples, together with a complete system providing for subsistence and pay during the period of re-education.

Basing its opinion on foreign experience, the report declares that "vocational rehabilitation cannot be regarded as costing the community, except temporarily, anything whatever. The disability of the soldier or sailor is an economic

handicap, reducing productive power. Unless the men are vocationally re-established, and to the extent that they are not completely re-established, the economic loss to the community will be cumulative during a long period of years. Even a slight increase in vocational capacity, as a result of vocational training initiated during the period of convalescence, will result in an economic gain which, also, will be cumulative over a long period. This aggregate cumulative gain will certainly exceed any expenditures for vocational rehabilitation."

The increase of the earning power of the handicapped man, thus rendering him economically independent, is the ultimate object of this program.

The plea is made that "all the experience and all the special equipment required for emergency war work will be needed to provide for similar work in the vocational rehabilitation of men disabled in factories and workshops, of the victims of accident in all dangerous employments, and of the thousands of otherwise injured and crippled persons thrown upon the community each year. The number of such persons in normal times greatly exceeds the capacity thus far developed for their vocational rehabilitation."

In addition to the above, it discusses methods of financing, organizing, and administering a national system of vocational rehabilitation; foreign experience and legislation are reviewed; and the proceedings of an inter-departmental conference held on the subject in Washington are summarized, together with suggested legislation.

II.

The vocational and educational problems involved in the rehabilitation of disabled soldiers and sailors are analyzed and discussed by the Federal Board for Vocational Education in Senate Document 167, just published under the title, "Rehabilitation of Disabled Soldiers and Sailors—Training of Teachers for Occupational Therapy."

Emphasis is placed on the immediate and pressing demand for the training of teachers of occupational therapy to take care of the handicapped men on their return from France. It is estimated that for every 1,000,000 men overseas, a minimum of 1200 teachers will be needed. What must be the qualifications of these teachers in view of the experience of the belligerent

countries; how they may be trained; what problems are to be met; and how they are to be met in the course of vocational rehabilitation; the social and economic aspects of rehabilitation; and the need for a national system for the rehabilitation of the maimed and crippled in industry, as well as in war, are the main topics of the bulletin. The document is written by Elizabeth G. Upham, under the direction of Charles H. Winslow, assistant director for research of the Federal Board.

The emergency program outlined in the report is summarized as follows:

The returned disabled men are divided into four classes: 1, those who are permanently invalidated; 2, those who are able to work, but cannot engage in competitive occupations; 3, those who must learn new occupations in the light of their handicaps; 4, those who are able to return to their former occupations. About 80% of all the disabled fall into the fourth group, and about 20% into the third group. The first two groups are relatively small.

For Group 1 the treatment prescribed is "invalid occupations," which are occupations that help pass the time and save the patient from brooding. For Group 2, those who will, in all probability, be unable to compete in any line of work, simple occupations are prescribed, to be carried on under the guidance of occupational therapists. Such occupations as wicker furniture-making, chair-caning, toy-making and semi-trades, will be taught these men.

For the 20% who must learn new occupations, a more elaborate course of rehabilitation is suggested. This will include simple occupations such as are taught to the men of the second group, followed by courses in general education wherever necessary, and followed in turn by prevocational education, that is to say, elementary vocational education; and, lastly, by vocational education in whatever line is best adapted to the qualifications and handicap of the man.

A similar curriculum is proposed for the 80% who will probably be able to return to their old occupations. Under the lead of the occupational therapist, the patient will be gradually taught simple occupations, his general education will be "brushed up," and the deficiencies supplied, and he will be re-educated so as to resume his former trade in spite of his handicap.

The Federal Board presents in this bulletin an outline of an emergency course covering eight

weeks for the training of teachers to handle all four groups of disabled men. It is expected that a fraction of the disabled men themselves will serve as instructors. Nurses and teachers of arts and crafts will be available for the invalid occupation work; trained and selected women of education, with previous experience in the arts, crafts and the "semi-trades," will be drawn on to teach simple occupations to Group 2. In addition to these, there will be need in Groups 3 and 4 of vocational teachers, preferably men, and men and women teachers, in general educational subjects, instructors in manual training, commercial subjects, mechanical drawing, drafting, etc. Teachers of each group should have had practical experience in hospitals or institutions, and it is recommended that teachers in Groups 3 and 4 should have experience in the same line of work in the military hospitals of Canada.

That every dollar invested by the Government in the vocational rehabilitation of disabled soldiers and sailors will bring handsome returns in national efficiency is maintained in the report. "If the war should finally end in economic exhaustion," says the report, "that nation will ultimately triumph which is best able to use over again her men. It is claimed that Germany uses 85 to 90% of her disabled men back of the lines, and that the majority of the remaining 10 to 15% are entirely self-supporting. Belgium, whose depletion has been the greatest, was the first nation successfully to use over again her men. Not only has the large Belgium re-education center of Port Villez been self-supporting, but in addition, it has paid back to the Belgian Government the entire capital cost of installation.

"Economic necessity has made possible the results achieved in Belgium. For the other nations, not so hard pressed, the rehabilitation of the disabled and the strengthening of the vitality of the civil population may be an important and perhaps a determining point in their economic future. . . It is certain that our own economic future depends, to a large extent, upon the rehabilitation of those disabled both in war and industry."

The bulletin discusses at length the possibilities of development of occupational therapy and the equipment needed for all the groups described. Suggested blanks for keeping the records in the curative workshops and for hospital registration are included.

VENEREAL DISEASE AS A MENACE TO THE NATION.

THE American Social Hygiene Association has recently issued the following brief, showing the seriousness of the problem of venereal diseases and their relation to the war, and the responsibility of civil communities for conditions in the Army. The Council of National Defense urges public officers and citizens of the United States to employ every means possible in the repression of prostitution and the control of venereal disease, for the following reasons:

First, because we must prevent such conditions as have developed in Europe since the beginning of the war.

(1) "The number of syphilitics in the Army must certainly be several hundreds of thousands . . . Since the war began, a total equivalent of sixty divisions have been temporarily withdrawn from the fighting for venereal diseases (Vienna report).—*Journal of the American Medical Association*, March 10, 1917, Vol. 68, No. 10, p. 814.

(2) "During the first eighteen months of war one of the great powers had more men incapacitated for service by venereal disease contracted in the mobilization camps than in all the fighting on the front."—*Social Hygiene*, Vol. 3, No. 2, p. 205.

(3) "In the war zone of France there has occurred an alarming increase of venereal disease, both amongst the soldiers and the civilian population."—*The Medical Officer* (London), No. 499, March 3, 1917.

(4) "The failure of the . . . Government to protect their soldiers from these evils (sexual vice and alcoholism) is the gravest error that the Government has committed; for these vices have proved more destructive to the . . . people since August, 1914, than all the . . . artillery, rifles, hand grenades, poisonous gases and fire blasts. Those killed by shot and shell transmit no poison to their families and descendants—the victims of alcohol and prostitution do."—From a letter by President Emeritus Charles W. Eliot of Harvard University, quoted in the *Survey* of Sept. 8, 1917.

(5) "Thousands upon thousands are withdrawn from the fighting army for weeks. But they are not only missed as fighters; they also cause expense and great obstruction through their transportation back home, through the necessity of establishing hospitals for thousands who were not wounded by the enemy. They burden the doctors so necessary for the care of the wounded. . . .

"But the very worst part of the venereal diseases is not the diseased condition immediately following infection, but the ailments frequently developing in later years, when the war is long

past and the old infection already forgotten, and the transmission of the disease to the family after the return of the troops to their homes."—Prof. Albert Neisser, *Frankfurter Zeitung*, January, 1915.

Second, because serious conditions have already developed in the United States Army, due largely to conditions in civil communities.

(1) "At one National Guard Camp, 502 new cases of venereal disease were reported in one week."—*Official Bulletin*, Nov. 20, 1917, p. 6.

(2) It was found that most of the cases at one large cantonment originated, not in the camp or near the camp, but in civil communities from which the men came or through which they passed on the way to camp.

(3) "In the case of all the troops on the border, a vastly larger proportion of venereal disease was contracted before reaching the border than was contracted afterwards."—*Social Hygiene*, Vol. 3, No. 2, p. 220.

Third, because the War Department has asked our aid.

(1) "Our responsibility in this matter is not open to question. We cannot allow these young men . . . to be surrounded by a vicious and demoralizing environment, nor can we leave anything undone which will protect them from unhealthy influences and crude forms of temptation."—Secretary of War Baker in his letter of May 26, 1917, to Governors of all States.

(2) "We are not going to be able to obtain the conditions necessary to the health and vitality of our soldiers, without the full coöperation of the local authorities in the cities and towns near which our camps are located or through which our soldiers will be passing in transit to other points."—*Ibid*.

Fourth, because venereal diseases result in the infection of innocent women and children.

(1) "No disease has such a murderous influence upon the offspring as syphilis; no disease has such a destructive influence upon the health and procreative function of women as gonorrhea. . . . Inherited syphilis constitutes a powerful factor in the degeneration of the race."—Prince A. Morrow, M.D.: *Social Diseases and Marriage*, Chap. 1.

(2) "All previous war experience shows an increase of venereal disease. . . . When peace comes there is the danger of grave and widespread dissemination of these diseases. It is for that, that we must be prepared, and there is not time to be lost."—Report of National Conference for Combating Venereal Diseases (London). *Social Hygiene*, Vol. 3, No. 2, p. 235.

Fifth, because prostitution is not a "necessary evil."

(1) "Sexual intercourse is not necessary to preserve health and manly vigor."—Moss: *Manual of Military Training*, Section 1466, p. 522. See also statement signed by Walter B. Cannon, M.D., Harvard University; William H. Howell,

M.D., Johns Hopkins University; and 355 other foremost medical authorities in the United States.—M. J. Exner, M.D.: *The Physician's Answer* (Association Press, New York), pp. 14, 24-51.

Sixth, because the "restricted district" and other attempts to regulate prostitution, have proved ineffective.

(1) See Flexner: *Prostitution in Europe*, pp. 175-6, and the reports of Vice Commission in Chicago, Minneapolis, Syracuse, Philadelphia and many other cities.

Seventh, because repression is the only feasible method.

(1) "The only practical policy which presents itself in relation to this problem is the policy of absolute repression, and I am confident that in taking this course the War Department has placed itself in line with the best thought and practice which modern police experience has developed."—Secretary of War Baker in his letter of August 14, 1917, to Mayors and Sheriffs.

(2) "This policy involves, of course, constant vigilance on the part of the police, not only in eliminating regular houses of prostitution, but in checking the more or less clandestine class that walks the streets and is apt to frequent lodging houses and hotels."—*Ibid*.

Eighth, because it will be better to handle the situation locally and thus make military interference unnecessary.

(1) One commandant issued orders forbidding all use of intoxicating liquor and all patronizing of immoral resorts. Every woman who got off a train was watched until her business was known. If necessary, she was put out of the vicinity.—*Social Hygiene*, Vol. 3, No. 1, p. 155, also Association Press (New York), April, 1917, p. 379.

(2) "If places of bad repute spring up outside the five-mile limit, but fairly accessible to the camp, I shall not hesitate to insist upon their elimination."—Secretary of War Baker in his letter of August 14, 1917, to Mayors and Sheriffs.

TETANUS IN BRITISH HOME MILITARY HOSPITALS.

THE *British Medical Journal* has recently published the following analyses of cases of tetanus treated in home military hospitals. The first covers November and parts of October and December, 1916, and deals with the first one hundred completed cases since the latest previous analysis was made.

"During the four periods analyzed the rate of mortality has steadily gone down. In the

first group the mortality was 57.7%; in the second 49.2; in the third, 36.5; of the present series of 100, 69 recovered—mortality 31%. The ratio of cases of tetanus to the number of wounded soldiers treated in home military hospitals was, roughly, six times as high in September, 1914, as it was two months later; and it remained at or about the lower level until the end of 1916. This fall in ratio was undoubtedly due to a great extent to the introduction of prophylactic injections of antitetanic serum, which took place about the middle of October, 1914.

The present series shows once again that the shorter the incubation period the greater the mortality rate, and vice versa. There were only twelve cases with a short incubation period (that is, up to ten days), and sixty cases with an incubation period of more than twenty-two days; the shortest incubation period was seven days, and the longest 190. Since the beginning of the war there has been a diminution in the number of cases with short incubation periods, and a corresponding increase in the number of cases with long incubation periods. This is a measure of the action of the prophylactic inoculation of antitoxin.

Sir David Bruce points out that it is sometimes by no means easy to decide whether a case is one of localized or generalized tetanus. He defines general tetanus as that in which spasticity or rigidity occurs in muscles distant from the site of wound, trismus being the most common initial symptom in this form; in local tetanus the spasticity or rigidity is confined to the muscles in the neighborhood of the wound. He looks on local tetanus as a much modified variety of the original disease, or even as a new type due to the action of the prophylactic injection. In general tetanus the toxin molecules may be pictured as gaining entrance to the circulation, and so reaching all parts of the nervous system. Of the 100 cases under review, 61 could be placed in the general, and 28 in the local group; in the remainder there was doubt. In the 61 cases of generalized disease there were 21 deaths—mortality 34.4%. All the cases of localized tetanus recovered. Trismus was recorded in 54 of the generalized cases, opisthotonos in 17.

With regard to operative interference, the Tetanus Committee advises that when operations are performed at the site of wounds, even if they are healed, a prophylactic injection of serum should always be given; further, they consider it probably safer to abstain from surgical interference with the wound until the ordinary treatment for tetanus has been carried out, unless there are other and imperative reasons for immediate operation. When the symptoms of the tetanus have subsided, and the tissues are flooded with antitoxin, then the wound can be opened up and searched for foreign bodies or hidden collections of pus and tetanus bacilli.

Of the 100 cases, 61 were noted as having received a prophylactic injection in France; of

these 51 recovered—mortality 16.4%. Of the remaining 39 cases, 22 were not recorded to have had prophylactic treatment, though probably many received it; of these 12 recovered—mortality 40.5%. Of the remaining 17 patients who had no prophylactic injection of any kind, 6 recovered—mortality 64.7%. The number of patients treated with antitetanic serum after the onset of symptoms was 98, of whom 68 recovered—mortality 30.6%. Of the two cases which did not receive therapeutic treatment with serum in England, one recovered and the other died.

Once again the analysis of the cases furnishes no evidence either for or against the intrathecal route. It will be remembered that in the first year of the war the figures seemed to show that this route showed advantage over others. Analysis of the figures relating to dosage likewise furnishes no useful deduction as to the curative influence of this factor."

The second analysis, being the fifth in the entire series, covers the remainder of 1916 and the first quarter of 1917.

"The numbers of cases of tetanus dealt with in the five periods, and the rates of mortality, are given in the following table, which speaks for itself:

ANALYSIS	NO. OF RECOVERED CASES	DIED	MORTALITY PER CENT.
1914-15	231	98	42.7
1915-16	195	99	50.8
Aug.-Oct., 1916	200	127	63.5
Oct.-Dec., 1916	100	60	60.0
Dec., 1916-Mar., 1917	100	81	81.0

In the second analysis the statement was made that 'early treatment should be striven for, and if this were done and the antitoxin applied thoroughly, one would not despair of reducing the mortality to, say, 20%, instead of 50%, at which it stands for the past year.' It will be seen that this ambition has been more than realized so far as the returns of the last 100 cases are concerned. This large reduction in the death rate is most satisfactory, but Sir David Bruce wisely refrains from expressing an opinion as to whether it has been due to the specific treatment or to one of the several other factors involved. Whatever be the cause—the prophylactic dose of serum, better surgical treatment, quicker diagnosis, more thorough therapeutic treatment—the result is gratifying.

Referring to the factor of surgical treatment, it is pointed out that if this could be made entirely successful, by cleansing and sterilization of wounds at the outset, there would be no more cases of tetanus; but while there is some evidence of an improvement in surgical technique much remains to be done. The present analysis repeats and brings up to date figures showing the number and distribution of cases of tetanus treated in home military hospitals since the beginning of the war.

Among the last 100 cases we find that where the symptoms of tetanus appeared within ten days of receiving the wound, the mortality was 40%; where they appeared between the eleventh and twenty-fourth day, it was 25%; in the remaining 66 cases, with an incubation period greater than twenty-five days, the mortality was 13.6%. In one patient the incubation period was stated as 786 days; but this for various reasons is regarded as a doubtful case which should be ignored for statistical purposes, although, as Dr. Goadby has shown, the tetanus bacillus may remain for a long time quiescent at the site of old wounds. Disregarding this case, the longest incubation was 365 days, and the shortest three days.

Since the beginning of the war the average incubation period has been steadily lengthening. This should probably be attributed in the main to the prophylactic injection of antitoxin. In the first year of the war 47% of cases had a short incubation period; in the last analysis this had fallen to 10%. Correspondingly, the percentage of cases with a long incubation period has risen from 6.4 to 69.

In our summary of the last analysis (September 15, 1917) we printed Sir David Bruce's working definitions of general tetanus and local tetanus. In the present series it was found on examination that 81 cases could be placed in the general group, and 19 in the local group. Among the former there were 58 recoveries and 23 deaths, giving a mortality of 28.3%. All the cases of localized tetanus recovered. There is no evidence to support the view that the presence of a fractured bone complicating the wound is a source of danger heightening the death rate from tetanus.

In six of the cases tetanus is reported to have followed an operation, and one died. In none of these was a prophylactic inoculation of antitetanic serum given before the operation, although the advice of the Tetanus Committee is that this should always be done. As in each preceding series of cases, the mortality among patients who had received no prophylactic injection in France was considerably greater than among those so protected. It should be noted here that the present policy advocated by the Tetanus Committee of the War Office, is that four prophylactic injections should be given to every wounded soldier at intervals of seven days, but in periods of hard fighting this might sound a counsel of perfection.

The whole of the 100 cases under review received therapeutic doses of antitetanic serum; in the preceding series all but two were so treated. The considerable reduction in the mortality, from 31 to 19%, would not appear, therefore, to be due to this factor, and, as Sir David Bruce states in his conclusions, the evidence as to the therapeutic effect of antitetanic serum is still inconclusive. Once again the figures furnish no case, either for or against the intrathecal route

as compared with other methods of injection; similarly, from the figures relating to dosage no useful deduction can be drawn."

AMERICAN HOSPITALS AND SURGEONS IN FRANCE.

THE *Lancet* has recently published the following editorial comment on the work already accomplished by American hospitals and surgeons in France since the outbreak of the European War. The eulogistic character of this comment will be gratifying to American professional pride and should be a stimulus to higher endeavor on the part of every member of the profession, whether or not in the military medical service, during the remainder of the war.

"The reference to the American medical units made by Sir Donald MacAllister in his presidential address to the General Medical Council calls to mind that it is not this year that members of the medical profession in the United States of America began to play a part in the war so far as the important section of it, conducted by the British Expeditionary Force in France, is concerned. The American Hospital outside the Neuilly gate of Paris, which at one time worked for the British as well as for the French forces, opened its doors within the first few weeks of the war; about the same time also an American motor ambulance team, which included a certain number of American medical men, also began to work, and not very many months had passed before more than one medical man of American extraction and education had successfully volunteered for service in the commissioned ranks of the Royal Army Medical Corps itself. It was also well before the first year of the war was over that a plan was working under which two university centres in the United States undertook to supply the medical staffs of not less than two base hospitals. The teams engaged to serve for not less than six months, a portion of them then returning home and being replaced by new arrivals. They were American units in the sense that the ward medical officers, surgical experts, and officers in charge of divisions, as also the officers in charge of special departments and the nurses, were drawn from the United States, while their administrative officers and the other ranks were supplied by the Royal Army Medical Corps. One of these hospitals is still at work alongside similar base hospitals more purely American in character which got to work this year. Of these there are about half a dozen, and though they bear the numbers of the British General Hospital units which they replace and whose habitations they inherited, they are all complete American units in the sense that each of them was formed in the United States as part

of the general arrangements made by the American Red Cross Society in anticipation of the possible extension of the American army. At first there were only two of them, but now they are about fifty in different parts of the United States, all raised to represent different localities or institutions. The first two units, representative of Harvard and the Western Reserve Universities, sailed for Europe within about five days of the time they actually received word from the Balfour Commission that their services would be valuable. These two first units were respectively organized by Professors Harvey Cushing and Crile, both of whom had previously in turn played a part in the affairs of the American hospital at Neuilly. The latter was for long worked on the principle that some distinguished surgeon formed his own team and brought it over ready to take charge of a section of the work for a period of three months; and the existing hospitals, to which reference has been made, seem to be constituted on the same principle but without the time limit. All of them have been formed with the idea that when the moment comes they will step into their places as units of the medical departments of the American army, and each has at its administrative head an officer belonging to the medical corps of the standing army of the United States. The other officers, who take complete charge of the professional work, are medical officers of the Reserve Corps (M.O.R.C.), and do their work under an officer who is always a more or less well known medical man in America, and bears the title of Director. He also holds rank as a major in the American army, the other officers being commonly lieutenants and sometimes captains. In the American army, as in the French, the nominal rank of officers is commonly a grade or two lower than in our own. There are also usually attached to each of these American units in France two officers of the Royal Army Medical Corps, one of whom acts as registrar, and assists the administrative commanding officer in respect of the returns required by the British authorities, and the other as quartermaster. There are at present American registrars and quartermasters also. There are also a few R.A.M.C. of other ranks at some of these units. With these exceptions, the whole of the personnel is drawn from the United States. They work under the orders of the D.D.M.S. of the area in which they happen to be placed (they are distributed over the principal British bases in France) and enjoy the advantage of the assistance of the consulting surgeons and physicians attached to the bases concerned. Most of them seem to fly the Stars and Stripes, but otherwise there is nothing to differentiate them from the other hospital units—British, Australian, New Zealand, Canadian, and South African—serving with the British Expeditionary Force, except in respect of the uniforms of their officers, nurses, and other ranks. Nor do they differ in their internal

arrangements as a whole, though they do differ materially in one important factor. They are strongly staffed on paper as compared with British hospitals of the same nominal size, and extremely strongly staffed in practice, since British hospitals in France seldom have more than about two-thirds of their official establishment strength. The United States officers in military hospitals are by no means the only American medical officers now in France. A large number of others not attached to hospitals have arrived in France during the past few months, and have been distributed among the armies at field ambulances, casualty clearing stations, and elsewhere. Whether the base units mentioned as well as the unattached medical officers will be withdrawn when the time comes for the American army to take its place in the line does not appear yet to be settled. Meantime the hospital units in particular are playing an exceedingly useful part, and the American medical officers, as a whole, are gaining an experience which will prove invaluable when the war for the American army really begins. Several of the American base hospitals are understood to have contributed surgical teams to the casualty clearing stations during the recent heavy fighting, and one American medical officer attached to a field ambulance is rumored to have been recommended for the Victoria Cross."

RED CROSS WORK WITH THE UNITED STATES ARMY.

ON February 22, the Bureau of Public Information at Washington issued the following statement defining the activities of the Red Cross in conjunction with the United States Army during the present war:

The statement setting forth the duties of the Red Cross follows, in full:

"1. To distribute sweaters, mufflers, helmets, socks, comfort kits, etc., and to receive the assistance and coöperation of all officers in making the distribution fair, equal and where most needed.

2. To render emergency relief of every kind upon the request or suggestion of an officer in charge. All officers are instructed to avail themselves of this assistance whenever, in their opinion, advisable. Officers should be none the less diligent in attempting to foresee the needs of their department in order that they may be supplied through regular Government channels. All such requests must be approved by the commanding officer, who will cause a record to be kept of all such articles.

3. To relieve the anxiety and to sustain the morale of soldiers who are worried about their families at home and to promote the comfort and well-being of these families, authority is given to the American Red Cross to place one or more

representatives of the home service bureau of the department of civilian relief at the service of the men of each division of the army wherever located. The soldiers should be informed through official orders of the presence of such representative or representatives and that the Red Cross is able and willing to serve both soldiers and their families when in need of any helpful service. This representative and his assistants will be accredited to the division commander and will be subject to authority and to military laws and regulations. This representative of the Red Cross will have the status of an officer in the army and will be provided quarters when available. Such assistants and clerks as may be necessary will be provided by the American Red Cross and must be males. These assistants and clerks, if any, will have the status of non-commissioned officers. All reports and correspondence of this officer will be subject to censorship of the commanding officer.

4. To conduct canteen service stations for furnishing refreshments to soldiers when travelling through the country, to furnish emergency relief to the sick and wounded when en route and to see that they are conveyed to a hospital when necessary and requested by the commanding officer. All commanders of troop trains are authorized to avail themselves of it whenever, in their opinion, advisable.

5. A representative of the American Red Cross may be attached to each base hospital to furnish emergency supplies when called upon, to communicate with the families of patients, to render home service to patients and such other assistance as pertains to Red Cross work. The representative of the Red Cross so assigned, with his assistants, will be accredited to the commanding officer of the base hospital and will be subject to the same regulations as to status, privileges, assistants and censorship, as provided in preceding paragraph applying to the representatives of the Red Cross assigned to divisions.

6. In order to render the above outlined service to the best advantage, the accredited chief officer representing the American Red Cross at division headquarters will be a field director.

7. Officials of the Red Cross assigned on duty with the military establishment, as outlined above, will be required to wear the regulation uniform of the American Red Cross, together with the insignia, etc., as approved by the Secretary of War.

8. The commanding officers of all other encampments or organizations to which Red Cross representatives may be assigned in accordance with this order, are authorized to furnish to the American Red Cross anything that they may request, within reason, such as warehouses, offices, light, heat, telephones, etc., in order to enable them to properly carry on the work for which they are assigned."

MEDICAL MATTERS IN PALESTINE.

The *British Medical Journal* has recently published the following extract from a despatch of General Sir Archibald Murray, describing the British campaign in Palestine from March to June, 1917. The despatch gives the story of the two attacks on Gaza (March 26 and April 17):

"On the first occasion the enemy was severely punished, 950 Turkish and German prisoners being taken and casualties, estimated at 8000, inflicted. The British casualties were under 4000. On the second attack the British casualties amounted to some 7000. Both attacks failed to reach Gaza, but a certain amount of ground was won and retained. Sir Archibald Murray says that no praise can be too high for the gallantry and steadfastness of the cavalry, infantry, artillery, Royal Flying Corps, and all other units which took part in the two battles for Gaza. With regard to the medical services he writes as follows:

"The health of the troops has throughout been singularly good. All branches of the medical services under Surgeon-General J. Maher, C.B., deserve the highest commendation for their successful work at the front, on the lines of communication, and in the base hospitals. The presence in the force of a number of civil medical consultants, who have so patriotically given their services, has been of the very greatest value, and they have worked in successful accord with the regular medical services of the army. The Australian Army Medical Corps and the New Zealand Medical Corps have also been remarkable for their efficiency and unremitting devotion."

Correspondence.

THE TREATMENT OF PNEUMONIA.

42 West 37th St., New York.
February 23, 1918.

Mr. Editor:—

To my mind, there are a few reasons why, hitherto, the treatment of pneumonia has been unsatisfactory. This is especially true in hospitals and also in instances where one plays the rôle of consultant in private practice.

In hospitals, as a rule, the patient comes in when the disease is already advanced and even good treatment has not a fair chance of success.

This is also true, in a measure, in civil practice, where the consultant physician is usually called when the disease is established.

In hospitals, patients are usually treated in the ward; in private practice among people at all well-to-do the patient has a room to himself and can be managed more effectively.

A patient stricken with pneumonia, or with a preceding bronchial or grippal attack which leads up to it, has the best chance to get well whenever he is isolated in his room from the beginning, whether it be at home or in a hospital, and a certain very simple treatment is mainly insisted upon, apart from what is in addition, eminently intelligent, and applies in all cases. The latter, to which I refer, are proper ventilation of the room, liquid assimilable nourishment, no

injudicious interference for purpose of finding out just how far the disease has progressed, and promotion of quiet and peace of mind. Inhalations of compound tincture of benzoin, with a proportion of beechwood creosote, should be started from the beginning of the disease and kept constantly going. A little of the best old brandy, or whiskey and black coffee from time to time and a hypodermic tablet of tincture of strophanthus, each containing one minim, placed under the tongue every two hours, is practically almost everything in the way of medication that is desirable and really useful.

If required, a little "cascara evacuant" for the bowels is the most suitable preparation to employ.

In looking back over a lifetime of caring for pneumonia patients, I have lost very few relatively, when I have been called in at the beginning of the attack and had practically the entire charge of the patient. I do not believe digitalis is of service, nor, indeed, strychnine. I do believe, in some instances, judicious and timely venesection will help save life. Hospital statistics have little weight with me on account of circumstances to which I have very briefly referred.

Experimental work is always problematical for quite a while and, by itself, should not be relied upon. I cannot but hope every general practitioner will take heart from what I have written and firmly believe and simply do as I urge. Then, and then only, will the great and increasing death rate of pneumonia become notably diminished.

BEVERLEY ROBINSON, M.D.

RECENT DEATHS.

JOHN MACLEOD MARTIN, M.D., a graduate of McGill University Faculty of Medicine in 1889, died at his home in Roxbury, February 19, 1918, aged 62 years. He was a Fellow of the Massachusetts Medical Society.

JOHN H. MULLEN, M.D., a graduate of Boston College, 1896, and Harvard Medical School, 1900, was recently found dead in his office. He had been suffering from an attack of pleurisy. He was 42 years of age. He is survived by his mother and six sisters.

JOHN B. CALLAHAN, M.D., who is noted for his scientific dental research work, died suddenly of apoplexy, February 20, in Cincinnati, Ohio, at the age of 65.

HOWARD BURHANS BESEMER, M.D., of Ithaca, N. Y., died at his home in that city on February 9. He was born in Dreyden, N. Y., on October 19, 1860, and graduated from the University of New York Medical College in 1891. He afterwards received an M.D. degree from the Cleveland Homeopathic Medical College. Dr. Besemer began practice in Ithaca and continued his work up to his death. He was a Fellow of the American College of Surgeons.

DR. LYMAN CURTIS BRYAN, a graduate of Boston Dental School, now Tufts Dental College, died recently at Lausanne, Switzerland. Dr. Bryan established himself in practice in that city after he had taken two years of postgraduate work in Germany and had remained there ever since. He was born in Kentucky in 1852.

APPOINTMENT.

DR. EUGENE R. KELLEY, head of the division of communicable diseases of the State Department of Health, has been appointed successor to Dr. Allan J. McLaughlin, State Health Commissioner, who has been recalled to Washington.

BACK NUMBERS OF JOURNAL WANTED.

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